1852 Vol. XLV JUNE 22nd, 1944

FLIGHT

and

AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB ONE SHILLING

RETURN TO "E" LIBRARY

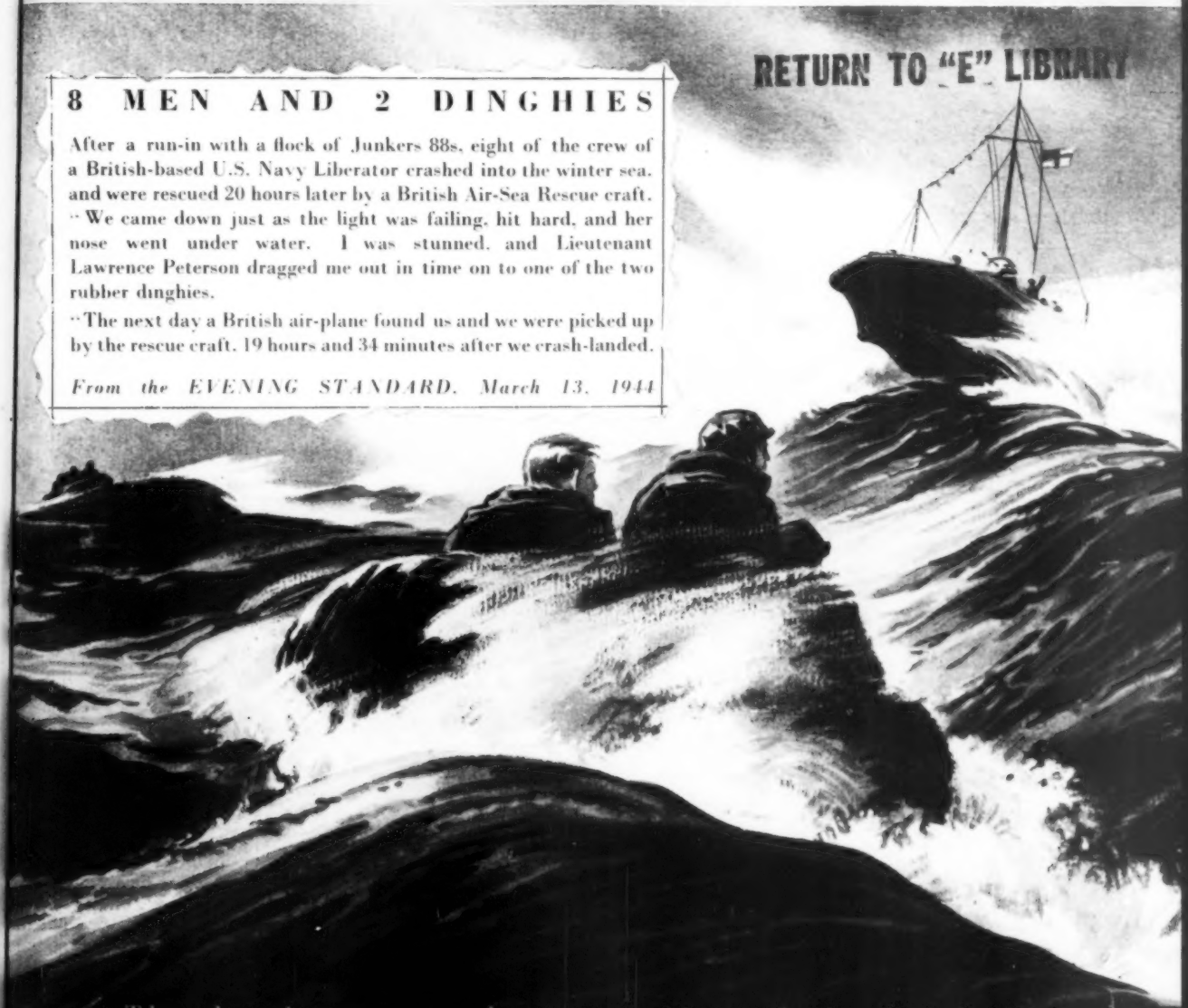
8 MEN AND 2 DINGHIES

After a run-in with a flock of Junkers 88s, eight of the crew of a British-based U.S. Navy Liberator crashed into the winter sea, and were rescued 20 hours later by a British Air-Sea Rescue craft.

"We came down just as the light was failing, hit hard, and her nose went under water. I was stunned, and Lieutenant Lawrence Peterson dragged me out in time on to one of the two rubber dinghies.

"The next day a British air-plane found us and we were picked up by the rescue craft, 19 hours and 34 minutes after we crash-landed.

From the EVENING STANDARD, March 13, 1944



The development and construction of the R.A.F. high Speed Rescue Launches is another of the achievements of

THE BRITISH POWER BOAT COMPANY LTD.

Constructors of Scott-Paine designed Surface Craft

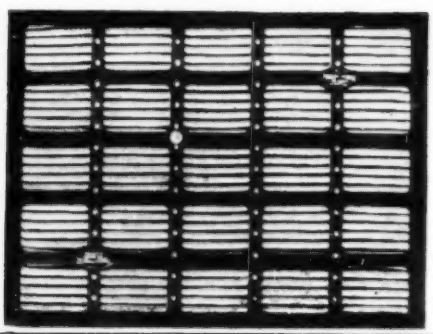
AIR FILTRATION *for* AIRCRAFT

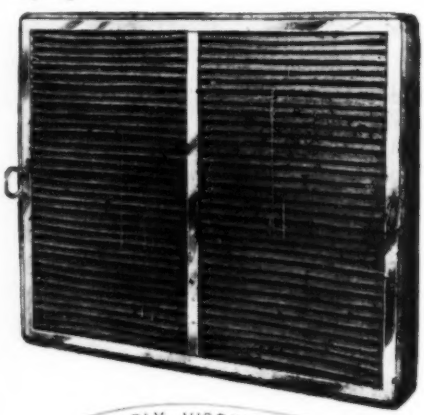
". . . problems have been overcome by two types of filter which we have been producing in great numbers—the Vokes Aerovee and the Vokes Three-ply.

The Aerovee is a dry type filter . . . It is made in five layers ; two of wire gauze between which there are two layers of fabric with a centre layer of special filtering material. These layers are stitched together and are then corrugated into deep folds, so that in relation to the air inlet an enormous filtering surface is created . . . It is part of the standard equipment of the Hurricane, Spitfire and Defiant fighters, and of the Wellington I.c., the Manchester and Halifax I bombers (to name but a few types of aircraft) . . . capacity in c.f.m. ranges between 560 and 3185 . . .

The Vokes Three-ply is a viscous type filter. It comprises two layers of wire-mesh gauze between which is a layer of fabric acting as an oil-retaining agent . . . The Three-ply is fitted (chiefly) to air-cooled engines and is standardised on the Beaufighter, the Beaufort, Blenheim, the Stirling, Albermarle and Halifax II. It is also used on the American Boston, Maryland and Lockheed Hudson III, IV and VI. (In all, about fifty types of aircraft are fitted with one or other of these filters). Really remarkable results have been achieved . . . types of engine that were worn out after twenty to fifty hours and often less were still worth reconditioning after two hundred hours flying . . ."

AEROVEE FILTER ELEMENT





THREE-PLY VISCOUS TYPE FILTER ELEMENT

From an article in "Flight" (February 24th, 1944) by C. G. VOKES, A.M.I.Mech.E., A.F.R.Ae.S., M.S.A.E., M.I.A.E., Managing Director, VOKES LTD., LONDON. S.W.

¶ VOKES AIR FILTERS ARE ALSO FITTED TO MANY AERO ENGINE TEST BEDS

FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

Jettery Lords

"THE thin end of the wedge" was an expression frequently used in the recent House of Lords debate on the taking over by the Ministry of Aircraft Production of Power Jets (Research and Development), Ltd. It is somewhat important to use the full title of the firm, cumbersome as it is, because in it are implied the functions and purposes to which, presumably, it is intended to devote this national company.

When, some two months ago, it was first announced that M.A.P. was taking over the firm we commented: "It means, or so we suppose and hope, that from now onwards the whole nation, via M.A.P., is behind the undertaking." The way we looked at it then, and the way we still prefer to look at it, is that the Government regarded jet propulsion and gas turbines as of such incalculable importance that everything possible should be done to ensure their development at a rate sufficiently rapid to keep this country in the lead.

For all that, we welcome the House of Lords debate. The position created by the steps taken is fraught with danger. Everything will depend upon the manner in which the new firm is handled, and we have confidence enough in Dr. Roxbee Cox as chairman and managing director to believe that he will see to it that the dangers are avoided.

These dangers are obvious enough. The company will, so far as development work is concerned, be in competition with the several private firms now engaged on work of this nature, and in spite of their having representatives on the advisory committee it will require a lot of good will on both sides to avoid the suspicion that the national firm's products are given preference.

From whatever angle one looks at it, the position seems to lead to the word "Farnborough." The Farnborough of 1912 or so, when the Royal Aircraft Factory (as it then was) was in direct competition with private firms, not merely in the matter of design but in construction. Lord Sherwood was somewhat unfortunate in the debate in choosing this example. The position became so impossible that not only production but aircraft design were taken away from "The Factory," which became what it should have been from the beginning, a research and test establishment.

Since then the R.A.E. and the industry have, on the whole, worked well together, and each has learnt something from the other. On engine development, for example, Farnborough has done much useful work, and since jets and gas turbines are power plants, it might have seemed more logical to extend the facilities at Farnborough. But perhaps M.A.P. came to the conclusion that the people at Farnborough are so wedded to jerky pistons that they could not be expected to take kindly to something which just goes "round and round"!

Short Memories

AS might have been expected, Lord Strabolgi was in favour of the jet equivalent of the Royal Naval Dockyards. Like Lord Sherwood, he apparently forgot the somewhat unfortunate early history of Farnborough. His remarks about handing over all our inventions and specially acquired knowledge to the company promoters of the City of London was somewhat beside the point since no one has suggested that this should be done. The firms engaged on this work are already very well established and are not in need of company promoters.

How easily facts can be misunderstood was illustrated by Lord Strabolgi's reference to "The Ring." Between the wars, he said, certain aircraft manufacturers banded together and it was difficult for any new firm to get a share of the market. The "Ring," so called, we might

remind Lord Strabolgi, was formed for the very good reason that orders were so scarce that even the few firms in the "Ring" had a struggle to keep alive. Had other firms come into the picture several would have had to close down. What that would have meant when the expansion came hardly needs stressing. Had the different Governments between the wars not cut military aircraft orders to the very bone there would have been no need for a "Ring," and in all likelihood there would have been no wasteful panic expansion.

The New Futility

FROM the point of view of technical ingenuity, one must admire the aerial torpedoes which Germany has lately taken to sending over Southern England. We have had no opportunity to study their internal details, but this much has been definitely established, that they are jet propelled and fairly fast. German scientists have evidently not been idle since those early days when von Opel experimented with rocket-driven aircraft.

There appears to be evidence that two types of these crewless aircraft are in use, one with wings of very low aspect ratio and one of considerably greater span. Both are believed to be jet propelled, and it may be that one version is radio controlled while the other is kept on its course and in the right attitude by gyroscopes. Both types of mechanism are sensitive to violent disturbances and either way the aircraft are likely to do strange things after anti-aircraft shells have burst near them. The behaviour of the crewless machines appears to indicate that in the main they are controlled by gyroscopes, an application of the ordinary automatic pilot used on bombers which would not be difficult. The duration of flight is relatively short, and precession would probably not be serious.

In this country we began many years ago to operate radio-controlled aircraft, the De Havilland Queen Bee being one type. It was used as a gunnery target. It would thus scarcely be surprising if the Germans, with developments in modern radio technique, had increased the range of control. Technically it should be possible. The coupling of jet with automatic control is logical because the jet lends itself, indeed demands, high speeds for worthwhile efficiency; and the fact that these missiles do not have to be landed, whereas our Queen Bees and Airspeed Queen Wasps had to make radio-controlled landings after each flight, means that the wing loading can be extremely high, a feature which fits in very well with jet propulsion.

While giving the German technicians credit for their ingenuity, one must wonder at the mentality of the authority (presumably Hitler) who has ordered these machines to be used. It is quite obvious that the strategic value is negligible, and the only explanation seems to be that the German people had got into such a state of depression that anything which, after the failure of the *Luftwaffe*, looked like counter-activity helped to restore the failing morale. That it is indiscriminate bombing to the last degree would not weigh with the enemy.

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AERIAL HOSPITAL TRAIN: Numbers of Transport Command Dakotas are used to bring wounded men back from Normandy. The speedy evacuation service and excellent hospital attention has resulted in less than one per cent. of the wounded losing their lives. In the North African campaign the percentage was five, and in the 1914-18 war as many as 11 per cent. died.

RADIO SILENCER : An important preliminary to the launching of the invasion across the Channel was the destruction of a number of German radiolocation installations by rocket-armed Typhoons. Here is one of them taking off to attack one near Boulogne.

WAR in the AIR

Diametrically Opposed Warnings : Goering Faces a Difficult Problem : Significance of Gelsenkirchen : B-29s Bomb Japan

WHEN the Normandy beach-head had been successfully established and the country was getting almost hourly news of how well things were going, Mr. Churchill issued a warning against undue optimism. In sharp contrast, Lt. Gen. Dittmar, spokesman of the German High Command, issued a warning in his weekly radio commentary against undue pessimism.

There was probably no real need for the former warning, because the British public has learnt too much about war during the past few years to start counting their chickens when the first crack appears in the shell. But the P.M. has always been as cautious over celebrating battles as he has been bold in planning them, and the country knows that his warning in no way suggests any lack of confidence in the ultimate outcome.

But Dittmar's opposite warning to the Germans may well have been only too necessary ; the very fact that it was given indicates that their High Command knows only too well how the German people will react to this breaching of a "fortress" they had been assured was "impregnable." Is it not just one more stage in the dismal process of disillusionment? In the Battle of Britain another "comtemptible little army" (in the air this time) roundly defeated the arrogant *Luftwaffe* ; the Third Reich, on which no enemy bomb was ever to fall, has been pounded by the Allied Air Forces with ever mounting intensity ; Rommel was driven out of Africa and Kesselring's forces are staggering back in Italy before the steady blows of the Fifth and Eighth Armies.

And now this!

Yes, one can well imagine that in many German houses the picture of "Mein Fuehrer" may have been removed from the wall of the best parlour and relegated to less dignified

ALL-STAR CAST : Fortress crews of the U.S.A.A.F. squadrons stationed in Russia snapped with Russian airmen at their base. The star on the Dakota, the PS-84 in the Soviet, is red. Note the dorsal turret.

WAR IN THE AIR

surroundings Hitler, one imagines, may well have "lost his stripes"—both of them! And though Britain knows better than to start throwing its hat into the air just yet, the Germans *must* be experiencing grave misgivings about the future; not to do so would be the blindest of optimism on their part.

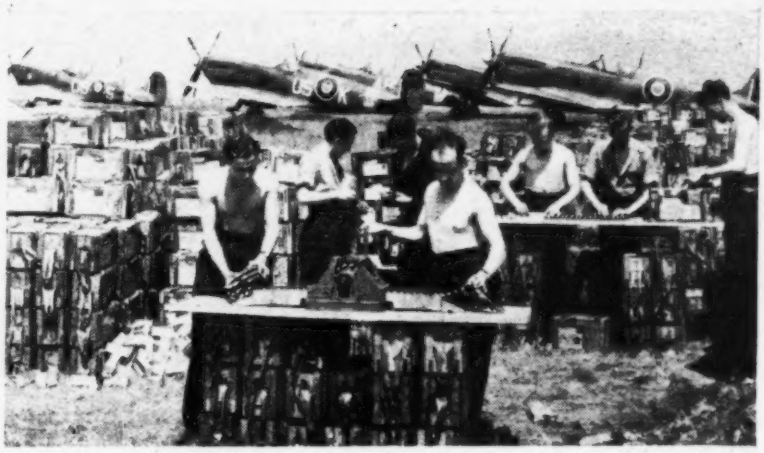
What of the German High Command itself? Patently it is in a first-class "flap" so far as the air situation is concerned. In the first place the *Luftwaffe's* reconnaissance before D-Day was so poor that they must have had only the most meagre information about our invasion preparations; in short, their "reccie" types let them down badly.

Double Demand

ALLIED air strategy is also now forcing the waning *Luftwaffe* to let the German people down (which gives special point to Dittmar's warning) and Goering is faced with such a problem that his medals must have become an oppressive weight even on his expansive chest. For his fighter strength is being bled by a double demand it cannot now meet; it cannot adequately counter the blows of both the Allied Tactical Air Force in Normandy, and the onslaught of our Strategic Air Force against targets in the Fatherland itself

Last week Goering decided to move some 500 fighter aircraft to the Normandy area and many of these had to be drawn from their home defence force. The Allies' counter-move was swift and twofold; the dozen or so German airfields within 100 miles of Caen were given a terrific pounding by a day force of more than 1,400 heavy bombers, and Bomber Command delivered a heavy night attack on Gelsenkirchen. This latter attack served two purposes; it was a serious blow at Germany's oil reserves, and it demonstrated the ability of the Allied Air Forces to back up the invasion and still keep up the long-term bombing of strategic targets inside Germany itself.

Not that the German Command has seriously denuded the Reich of fighter defence as yet, for the Lancaster force that went to Gelsenkirchen met strong night-fighter packs in addition to a heavy *flak* barrage, but Goering is now estimated to be losing in Western Europe alone some 40 or more fighters daily out of a total force of less than 2,000, and it is seriously to be questioned if Germany's depleted production, with heavy calls from the Russian and Italian fronts, can maintain the necessary reserves.



PACKING THE PUNCHES: Armourers at a unit of the 2nd Tactical Air Force belting up cannon ammunition for their Spitfires, some of which can be seen lined up in the background.

The strategic value of the attack on Gelsenkirchen was all the greater in view of the knocking out of the last of the Ploesti refineries in full production. Thirty-three per cent. of the enemy's oil supplies came from the Ploesti oilfields, whose output has been greatly reduced by recent attacks, and synthetic oil plants in Germany have also been heavily and successfully bombed during the past few months. Thus the Gelsenkirchen refinery, a few miles north of Essen, which had a capacity of 400,000 tons of oil a year and is the largest of the ten plants in the Ruhr and Rhine area, was a target of first importance. This would account for the strenuous efforts to defend it against our Lancasters, and the retention in this area of a much stronger force of night-fighters than has been encountered elsewhere since the invasion began.

Running Fights

NEVERTHELESS, the fighter packs did not arrive over the target until right at the end of the attack, by which time some 1,400 tons of high explosive and incendiary bombs had been showered down. But having put in a somewhat belated (from the German viewpoint) appearance, the fighters pursued the Lancasters on the route home, and there were some fierce combats lasting for many miles, and at least six of the enemy aircraft were shot down. A simultaneous attack was made by Bomber Command on Cologne and other aircraft were out laying more mines in enemy waters, the total cost of all these operations being 17 bombers.

During the first seven days of the invasion, Bomber Command made 6,000 sorties out of the total of 56,000 flown by the combined Allied Air Forces, during which they dropped 7,000 tons of bombs, shot down 36 enemy aircraft, and themselves lost 108. The 8th and 9th U.S. Air Forces together flew about 31,500 sorties in

AWAITING THE WORD: When the Germans brought up their panzers to meet the Allied invasion forces, they were attacked by our medium bombers. These Mitchell crews are awaiting orders for the first onslaught against the enemy armour.

WAR IN THE AIR

the same period, dropped about 24,000 tons of bombs, and accounted for 198 enemy aircraft for a loss of 217 bombers, fighter-bombers and fighters. The 2nd Tactical Air Force, Transport Command and Airborne Forces flew 12,000 sorties, destroying 106 aircraft for a loss of 107, the A.D.G.B., composed entirely of fighters, destroyed 56 German aircraft for a loss of 22 in 5,500 sorties, while Coastal Command flew approximately 2,800 sorties, also in the first seven days.

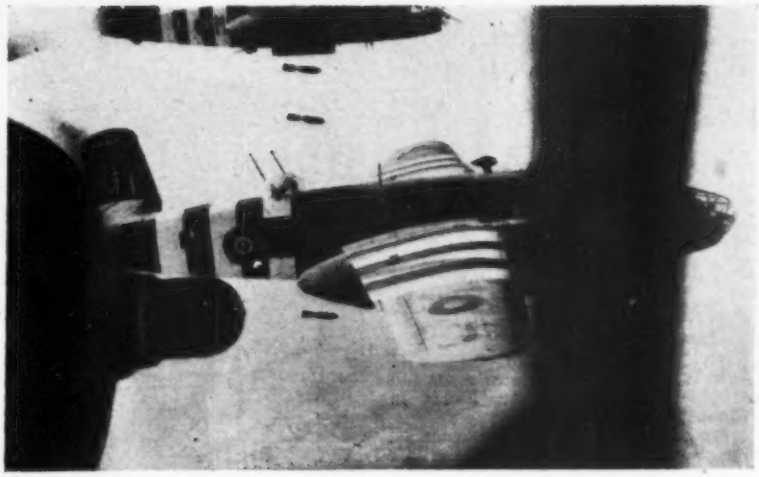
Actually these Allied losses represent slightly less than one per cent. of the sorties flown, while the enemy, having made fewer sorties, suffered a very much higher rate of loss.

A notable item of air news last week was the attack on targets in Japan, including Tokyo, by some of the new Boeing B-29 Super Fortresses.

Once before, it will be remembered, American bombers showed the Japs that, even then, their home territory was not quite out of reach of those whom they had so treacherously assailed on December 7th, 1941. That first taste of Allied air power—the first little taste of their own medicine meted out to Nippon—was administered by the gallant Mitchell squadrons led by General "Jimmie" Doolittle, who was in due course decorated by President Roosevelt for his courageous venture. It will be recalled, too, that the Mitchells took off from carriers some 800 miles from the Japanese mainland, and the survivors flew on to land in China.

But the Super-Fortresses, which have been described as making the B-17 look like a medium bomber, flew to the attack from a base in China and returned to that base afterwards.

With a wing-span of 141ft., the new B-29 is said to be able to deliver an eight-ton bomb load farther and faster than any other bomber now in service with the Allied air fleets, and with the steady retaking of suitable territory nearer and nearer to Japan, one looks forward with grim satisfaction to the launching, before very long, of a full-scale attack upon the breeding grounds of the Pacific enemy and the smashing of his war industries.



MALLORY'S MINIONS: Mitchells of the A.E.A.F. lend a little air support in the invasion area.

The "Secret Weapon"

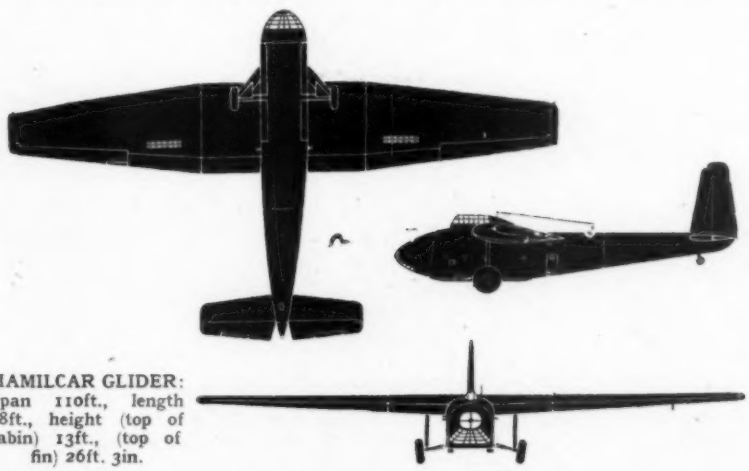
ON the home front the past week has seen the first uses of what must be presumed to be Hitler's secret weapon, namely the jet-propelled, winged bomb which is officially referred to as a "pilotless plane." Initial ideas that this missile was probably under radio control have since been discounted, one wireless commentator pointing out that there is no record of one ever having flown in other than a perfectly straight line.

Opinions expressed by various people whose experience with aircraft entitles them to a hearing, has placed the aerial performance of the winged bomb at speeds ranging from a minimum of 200 m.p.h. to more than double that figure. Our own view was that a speed somewhere about half-way between these two extremes would be nearer the mark, and since it is officially stated that Allied fighters of A.D.G.B. have found it by no means impossible to intercept them over the sea, clearly their speed is not so high that a modern fighter cannot cope with it.

Incidentally we salute the fighter-pilots who tackle these devilish machines; they may not be able to "dog-fight" or to take evasive action, but the risk entailed in attacking them with cannon fire and probably exploding them at what must be fairly close quarters calls for courage of the calm, determined kind with none of the thrill of man-to-man combat to offset the danger.

The British public first became aware that "Jerry" was evidently up to some fresh trick exactly a week ago to-night, when the "alert" stayed on right throughout the night and gunfire was heard at intervals long after daybreak. Everyone knew that no enemy pilot would, or could, remain in the skies over this country in daylight. There were the not unexpected rumours of "suicide" paratroop landings with swift sabotage as the object, but later the real explanation was forthcoming.

We are now growing accustomed to this return to a more or less 24-hr. state of alertness in Southern England, and if the ever-miscalculating Nazi imagines that this latest exhibition of unpleasantness can undermine the people's morale, he is doomed to yet another disappointment. It will only serve to give practical point to Mr. Churchill's warning against undue optimism, and to check any signs of slacking off at home, that may have followed the Allies' successful invasion of Normandy. It is abundantly clear, however, that the primary object of the much-boosted secret air-weapon is to provide diversionary propaganda for the use of Goebbels.



HAMILCAR GLIDER: Span 110ft., length 68ft., height (top of cabin) 13ft., (top of fin) 26ft. 3in.

HERE AND THERE

U.S. Commander in Russia

MAJ. GEN. ROBERT LEGROW WALSH has taken over command of the U.S. Strategic Air Forces in Europe, now based in Russia.

Previously, Gen. Walsh commanded the South Atlantic Wing of the Air Transport Command.

Renamed

IT is announced from Etousa headquarters that its Services of Supply has been re-designated as the Communications Zone, Etousa, with Lt. Gen. John C. H. Lee as Commanding General.

Gen. Lee's new task is in addition to his duties as Deputy Commander of the European Theatre.

Ether by Air

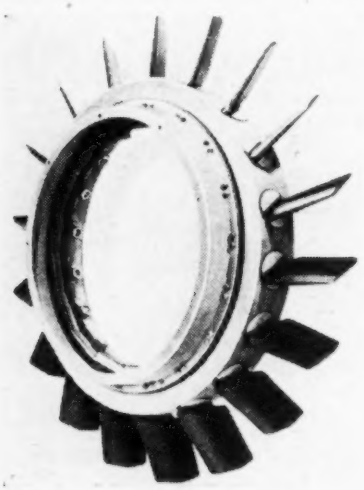
CASUALTY stations set up on the Normandy beachhead during the first few days of the invasion became in need of more ether, and further supplies were promptly flown over by R.A.F. Transport Command.

Packed in special containers to prevent the vessels containing the precious liquid from bursting on impact with the ground, the ether was dropped by parachute.

The Air League Stages a Show

AT the Bristol Aeroplane Company's showroom in Piccadilly the Air League of the British Empire has an interesting exhibition of pictures and other material showing the League's work in the past and its aims for the future. Admission is, of course, free, and it is to be hoped that a very large percentage of visitors will come to the conclusion that the Air League is worthy of their support.

After the war the Air League of the British Empire is going to do good work in pressing for the retention of a strong R.A.F. and a vigorous civil aviation policy.



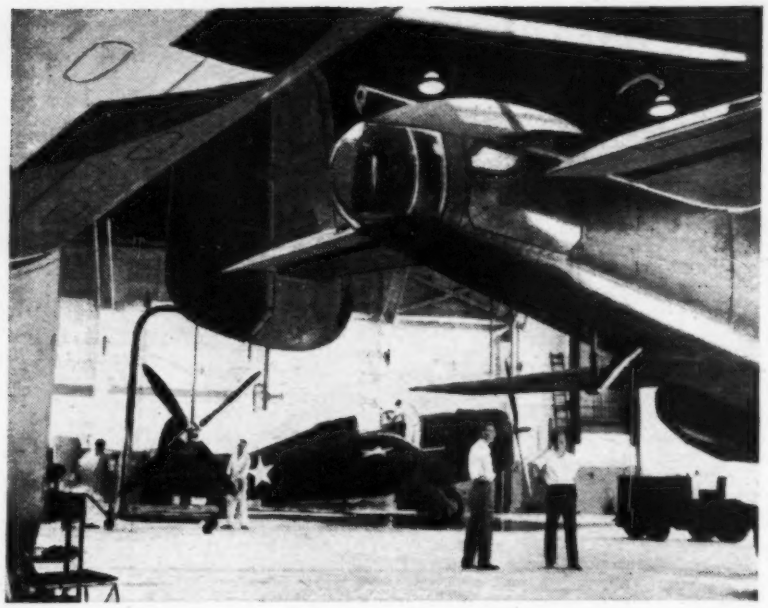
The Rotol cooling fan described in the adjoining column.

Rotol Cooling Fan

AN important feature of the Rotol cooling fan for radial engines, which is illustrated on this page, is that it can be readily adapted, with the minimum amount of alteration, to the various air-cooled engines already in service. Its function, of course, is to maintain an adequate velocity of cooling air over the cylinders during climbs at full power or when running up on the ground.

This multi-bladed fan is mounted on the back plate of the spinner and consists of a ring carrying the detachable and adjustable blades. Rubber cush-mountings are employed for the ring to prevent the fan from vibrating in phase with the engine.

Fixed blades either in front of, or behind, the rotating fan may be provided to rectify the airflow and ensure even distribution. The working temperature of the engine remains controllable by the normal cowling gills.



THEREBY HANGS - - - ! Chief interest in this glimpse inside the hangar of the Curtiss Wright Propeller Div. flight test unit, is the close-up of a Mitchell tail-turret. The "spout" above the Perspex is evidently a tow-line "hawse pipe."

Good Show!

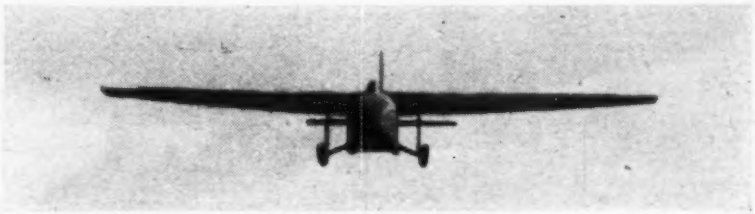
HEADQUARTERS Unit of Transport Command, R.A.F., last week-end staged a very bright little show in the Kodak Hall, Harrow, under the title of "Magic Carpet."

Accepting the Entertainment Committee's invitation, conveyed to us by Group Capt. S. A. Dismore, to look in at the first of the two evening performances, *Flight* found that "Magic Carpet" was a revue presented by Service personnel whose obvious talents more than hinted at a pre-war familiarity with this sort of thing.

Good show indeed—and some of the dresses made us think of C.B.C. How *do* they manage it these days!

So They Couldn't Talk

TO make quite sure that careless talk by local civilians should not give away last-minute invasion activities, the American authorities at a U.S.A.A.F. airfield in Britain detained in the camp all



DON'T LOOK NOW, BUT ——! What the Hamilcar glider looks like to the occupants of the towing aircraft.

HERE AND THERE

civilian workers and villagers who had seen anything of their preparations.

The "civvies" had to submit (we hope cheerfully!) to 48 hr. C.B. until the news of the landings was released. —Unusual, but very sensible.

Priority "Beaus"

THE production of Beaufighters in Australia has been given priority over that of Lancaster bombers, such is the need at present in the S.W. Pacific theatre.

"The full-scale manufacture of Lancaster bombers in Australia cannot begin until the Beaufighter programme is well under way," said Senator Donald Cameron, their Minister for Aircraft Production, recently.

New Post-war Transport

DOUGLAS AIRCRAFT CO. have just released some details of a new transport aircraft they are to build after the war. This machine is the DC 7, and is designed to carry 86 passengers with sleeping accommodation for 76.

It is powered by four 3,000 h.p. engines (presumed to be the new 24-cylinder Allisons) which, it is claimed, give the aircraft a speed of "up to 400 m.p.h."

The DC-7 can carry a load of 26 tons and has an all-up weight of nearly 65 tons. Dimensions are: Span 173ft. 3in., length 123ft. 4in., height 43ft. 8in.

Long-range Robin

THE SEAS SHIPPING CO. INC., which operates the Robin Line between New York and Cape Town, S. Africa, wants to parallel its surface routes with an air line, and has applied to C.A.B. for permission to inaugurate a scheduled weekly return air service. Alternative routes with co-terminals at Johannesburg and Cape Town have been suggested.

American Export Air Lines Inc. has also filed an application for a service to Cape Town, though the shipping side of this concern is not at present engaged in South African trade.

Forced Down

A REUTER message from Berne reports an official announcement that three heavy bombers of the U.S.A.A.F. were recently "forced down" by a Swiss air squadron patrol at Dubendorf, near Zurich.

"The twenty-eight members of the crews are safe and sound and have been interned. The American planes had flown over certain regions of Eastern and Southern Switzerland," stated the report.

Air Historian

MR. HILARY ST. GEORGE SAUNDERS, who wrote the official history of the Battle of Britain and several other war histories, is already at work collecting information for the official history of the air side of the Allies' liberation of Europe.

Mr. Saunders has, in fact, donned R.A.F. uniform with a "Special Duties" armband, and is attached to the staff of the Air Chief Marshal Sir Trafford Leigh-Mallory, A.O.C.-in-C. of the Allied Expeditionary Air Forces; he is given day-to-day access to all official documents so that he can obtain his material immediately. When he wrote the story of the Battle of Britain he was handicapped by being unable to begin until some months after the event.

Stukas by Night

THE seven-year-old Ju 87 (Huns, for the use of) has lately been found a job on the Italian front. "Specially equipped and armed," said the German radio recently, "they have been used in night attacks on Allied batteries, their hand-picked pilots specialising in pin-point attacks against important targets."

The German commentator somewhat naïvely explained that they were only used at night, "since attacks in daylight would be greatly hampered by enemy fighters."

Mainly for Modellers

A NEW organisation to watch over the interests of model aircraft enthusiasts has been formed; it is the Association of British Aeromodellers, and its avowed objects are "to promote, encourage, develop, organise and protect the model aeroplane movement in the United Kingdom and throughout the world." The association has temporary offices at 84, Hillway, Holly Lodge, Highgate, London, N.6.

Its first president is Sir Robert Bird, Bt. (Conservative M.P. for Wolverhampton West), who takes a keen and practical interest in model aircraft. Incidentally, Sir Robert and Lady Bird were pioneer air passengers, for in 1911 they flew from the beach at Biarritz in a Henry Farman "Longhorn," enjoying its "built-in headwind" for about half an hour.

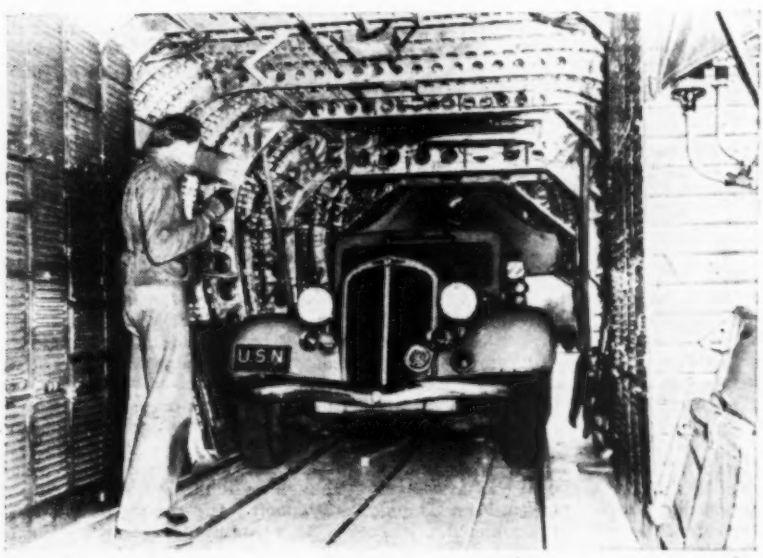
Ban on "Gas" Models Lifted

ANOTHER item of interest for aero-modellers is that the Air Ministry has partially lifted the ban on petrol-driven model aircraft—or "gas models," as our U.S. friends more briefly term them.

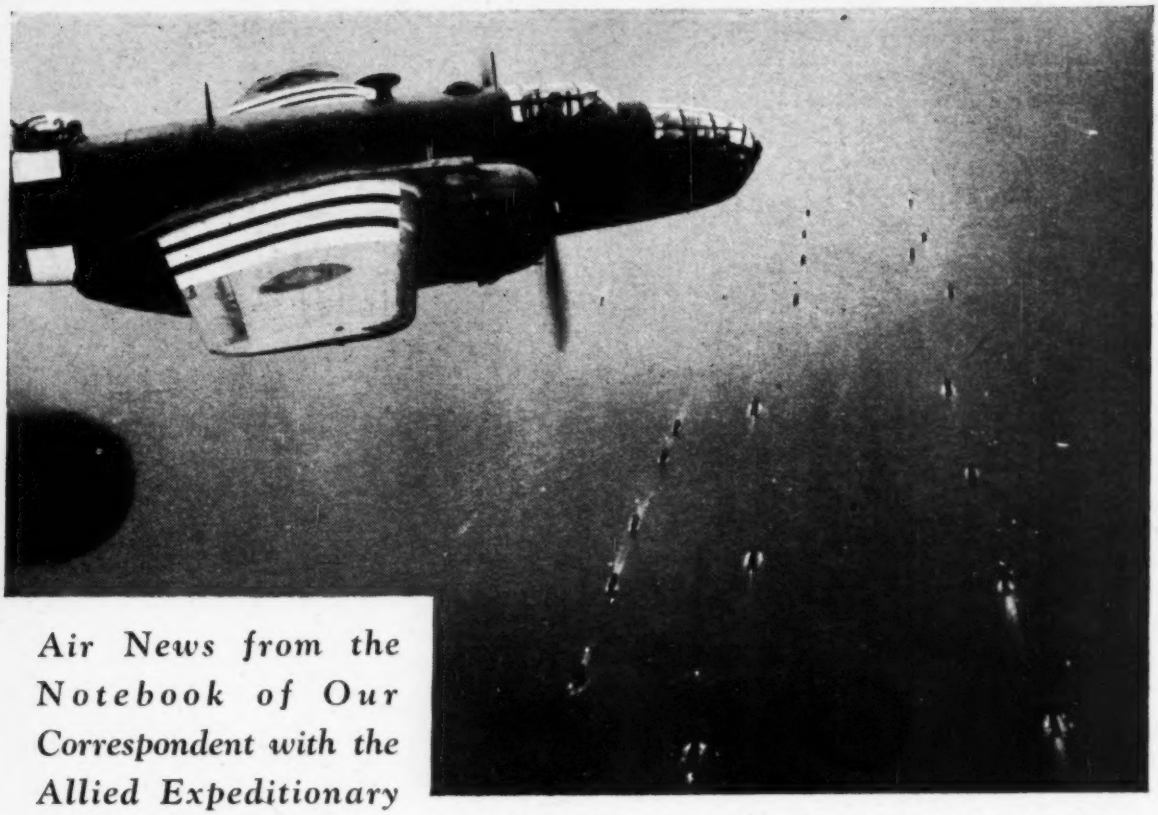
This type of model aircraft may now be flown in areas north of a line drawn through Southwold, Bury St. Edmunds, Bedford, Gloucester and Bristol Channel, but only by members of bona fide model aircraft clubs, and *not* between sunset and sunrise, *not* in officially prohibited areas, and *not* within two miles of an R.A.F. station.

Other stipulations are, wing span not to exceed 10ft., engine running time not to exceed 45 secs., and maximum time airborne not to exceed two minutes, each of the last two limits to be mechanically controlled by an approved device.

D



CONESTOGA CARGO: Driving a U.S. Navy motor ambulance into the "hold" of one of the new Budd Conestoga transport aircraft demonstrates its capacity to handle bulky freight. The aircraft is of spot-welded stainless steel construction.



An A.E.A.F. Mitchell passes over convoys sailing to and from the invasion beaches.

Air News from the Notebook of Our Correspondent with the Allied Expeditionary Air Forces

Invasion Close-up

THE first flush of the invasion having died down, it is profitable to pick up some of the threads of pre-invasion work by the air forces and to tell of some of their exploits, the account of which had to be withheld until after D day.

The isolation, by road and rail, of the effective area of France will probably remain for a very long while as a classic example of the use of air power. The attack opened on March 7th with a concentrated raid on the railway yards at Le Mans. This was but one of 82 rail centre targets which ultimately received attention. By the day of the "big show" 50 of these had been utterly destroyed, a further eight nearly destroyed and another 17 severely damaged.

To achieve this result, bombers of the A.E.A.F., 2nd T.A.F., dropped 5,600 tons of bombs in 8,000 sorties; Bomber Command dropped 20,000 tons in 4,600 sorties, and the U.S. 8th A.A.F. dropped 7,000 tons in 3,000 sorties. The result was a complete rail desert west of Paris. (In passing it is interesting to compare the average bomb load of the British night bombers with the loads carried by the American heavies in daylight.)

Not only rail centres, but rail and road bridges received considerable attention. These represent the targets most difficult to hit. Nevertheless in 5,209 sorties by A.E.A.F. and 445 sorties by the Americans, 17 railway bridges were destroyed and two were rendered impassable. Twelve road bridges were also put out completely. For this task 5,737 tons of bombs were used.

In the invasion area there were twelve strong points with heavy coastal batteries installed. Maraunders and Bomber Command between them dropped some 4,400 tons on these targets to put five of them out of action and severely damage the other seven. The enemy's coast radio installations were obviously of vital importance and no fewer than 21 of these difficult targets were destroyed and a further nine damaged. To achieve this, 1,700 sorties were flown, 1,200 500 lb. bombs were dropped and 3,500 rocket projectiles used. The net result of this attack showed itself on D-day.

Estimate of Produce

All this experience of bombing such a diversity of targets has enabled the High Command to work out what might be termed an "estimate of produce." A particular target at a particular range can now be assessed by the air staff to require x number of x lb. bombs dropped from x height by x type aircraft to ensure destruction. This is much more important than it seems because, as the Germans have found to their cost, nothing is so easily wasted as air power. How the enemy must now yearn for the thousands of aircraft, the thousands of tons of bombs and, most of all, the thousands of trained aircrews he has thrown away in aimlessly destroying little people's homes.

It was with the foregoing in mind that I went to a photographic reconnaissance wing to see how they checked whether the targets had been destroyed or whether another visit was necessary. Although many of the photographs are taken from as high as 30,000ft., the clarity of detail is phenomenal. It speaks very highly for the 36in. focus English lenses which are used. One would, of course, expect to be able to see whether a bridge has been destroyed, but from these photographs it is possible to see tiny marks in the cement runways on airfields.

A more direct employment of the wing in connection

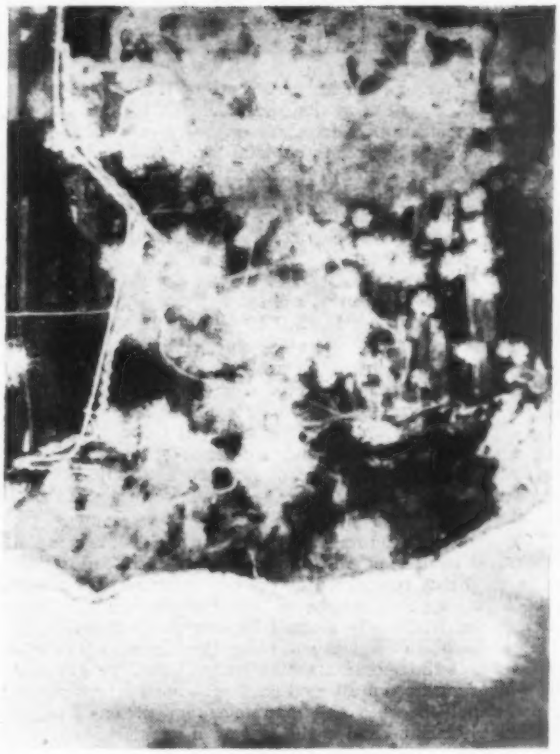
with the invasion has been the mapping of the Continental coast. This has gone on for over two years. The actual beaches and littoral of the invasion area were photographed at every state of the tide to obtain exactly the gradients to be traversed and to assess what obstructions would be met. The beaches no longer interest them, and they are now keeping an eye—or rather many eyes—on the roads, railways, bridges, canals and rivers in the back areas. They are probably also doing special work for the planning staff which may not reach fruition for months to come. Quite by the way, and just to show how thoroughly these things are attended to, it is interesting to know that there is a special body of railway men who have been trained to read air photographs and who now assess the effect of the damage caused by the bombing of railways.

Photographic Requirements

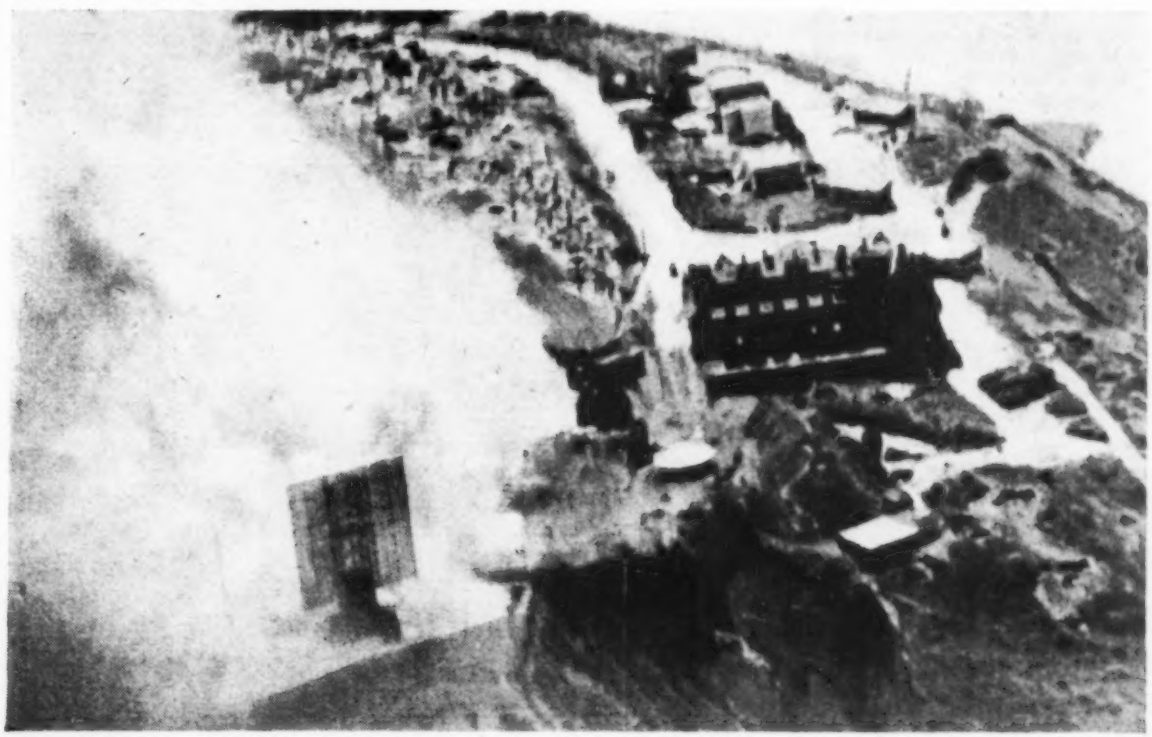
One of the essentials of flying for photographs is that the actual taking run shall be straight and level and free from enemy interference. That is the reason for the selection of high-speed aircraft—special Spitfires and Mosquitoes—and also the reason for the great height at which they fly. Not but what the pilots are prepared to take any necessary risk if the need is sufficient. For critical invasion-day photographs they were prepared to come down, if necessary, from 30,000ft. to 5,000ft. Actually, the weather was bad, and they came down as low as 1,500ft.

These pilots and navigators may go out totally unarmed many miles deep into enemy territory. Any armament carried would cut down speed and range. On the special Spitfires which are used, the leading edges and main spars have been sealed off and become two long auxiliary fuel tanks. Behind the main spar, just outboard of the wheel recess, on both port and starboard sides, automatic cameras are fitted. They have only 5in. focus lenses and project but very little below the under-surface of the wing. Two large cameras with 36in. lenses are fitted in the fuselage.

When battles of the present magnitude are at their height, the supply and issue of aircraft replacements



One of the coastal strong points on the Continent after receiving a dose of softening-up mixture from the U.S. 8th A.A.F. A blanket of bombs is dropped to smother the whole of the area.



A vivid photograph taken during a rocket projectile attack on an enemy radio installation. The radio aerial can be seen clearly amid the smoke in the left-hand bottom corner.

INVASION CLOSE-UP

becomes a major problem. To see how it all functioned I paid a short visit to a maintenance unit commanded by the ever-genial Sqn. Ldr. Cook, who—in peacetime—used to spend his days tuning special motor cycles and cars for racing. He thinks his present job is rather similar to that because his unit converts what arrive as just flying machines into operational aircraft. The unit handles a diversity of types: Typhoons, Lancasters, Mustangs, Albemarles, Austers I to IV, Tiger Moths, Horsa gliders and the new Hawker Tempests. There was a gratifying number of Tempests to be seen on the tarmac, and it is a pity that no description is permitted.

Sir Stafford Cripps the other day gave our annual output as 27,300 aircraft. In addition to those returned to service from civilian repair organisations, every one of these has had to pass through a maintenance unit before going into action. Air Transport Auxiliary is responsible for all flying to and from the manufacturers, but test flying is, of course, done by pilots belonging to the unit. Here is a brief account of what happens to each of these thousands of aircraft:—

On arrival at the receiving park of the M.U. a complete technical inspection and equipment check is carried out. This might be considered as the customer's (Air Ministry) check on the goods bought on behalf of the public. To the list of deficiencies ascertained by this check is added the items which are necessary to bring the aircraft up to what is known as the operational standard of issue. This includes the incorporation of all modifications—both structural and operational—because the manufacturers' production line invariably lags behind in the matter of operational requirements. A certain amount of secret equipment also has to be installed.

Occasionally the modifications are so urgent that no manufactured parts are available to carry out the work. In a case such as this the unit's workshops turn to and produce the necessary bits and pieces. The amount of work required for each aircraft varies considerably according to type. The Tempests and Typhoons, for example, only need a general check-over and harmonising and arming of the guns. Thirty to forty minutes' test flying finishes the job.

Part of a concentration of our Horsa gliders in Normandy as seen by the camera of a photographic reconnaissance wing. Authorities say that the concentration of British gliders was even better than would be expected at an exercise. The fuselages of the Horsas are not broken. Special fittings enable the tail ends to be removed in emergency.

Pushing a long-range Mustang into a hangar at a maintenance unit for final titivating after running-up the Rolls-Royce Merlin. Note the Spitfire-type cockpit cover.

INVASION CLOSE-UP

With the Canadian-built Lancaster the story is rather different. About 1,000 man-hours' work has to be put in on each of them before they can take their place as front-line aircraft. The imported Lancaster has the Packard-built Rolls-Royce Merlin engines and Hamilton Standard airscrews. When the Lancasters fly the Atlantic on their delivery flight they do not carry any gun turrets and these have to be fitted by the maintenance units after arrival. It is this last fact which accounts for many of the man-hours.

When an aircraft is finished it is added to the list of available machines and is then allocated either for immediate use, temporary open-air storage or hangar storage. In the event of the latter a special maintenance programme is carried out in order that the aircraft may remain in operational condition.

Working on a Canadian-built Avro Lancaster. Turrets are fitted after arrival in Britain.

To cope with the most urgent replacement of men and machines there are at the maintenance stations special Group Support Units which comprise a pool of aircraft and operational pilots who are posted as required to the group to which they are attached.

Now a final note on air cover. There was a time when we were losing ships at such a rate that the whole progress of the war was in doubt. Coastal Command's work has been such, however, that dock space has now become a major problem. Not one American merchant sailor has lost his life in the invasion cross-Channel shuttle service. Since these men get a special danger payment of 125 dollars every time their ship is hit I can see an action being brought against the Air Command for loss of profit.

FIRST ATLANTIC FLIGHT CELEBRATED

THE first direct transatlantic flight by Capt. John Alcock and Lieut. Arthur Whitten-Brown, which was dealt with fully in last week's issue, was celebrated at an informal luncheon given in London by the directors of Vickers-Armstrongs, Ltd., and Rolls-Royce, Ltd., on June 13th. Sir Arthur Whitten-Brown was the guest of honour and paid a handsome tribute to those who had made the flight possible—Vickers, Rolls and, last but not least, the men who groomed the machine for the flight, and a special one to Air Comdre. H. G. Brackley, who, Sir Arthur said, had lent him an Abney level without which he could not have worked out his position from the few sights obtained.

Sir Arthur recalled that this country had fought for the freedom of the seas and had made of it a gift to a somewhat unappreciative world. He expressed the hope that as a result of peaceful agreement we should similarly have freedom of the air, and that the R.A.F. would be maintained at a strength sufficient to maintain that freedom in peaceful security.

Speeches were also made by Major Kilner (of Vickers-Armstrong's), Mr. Sidgreaves and Mr. Hives (of Rolls-Royce), Air Marshal Sir Frederick Bowhill (chief of R.A.F. Air Transport Command), and by Lord Rothermere.

Major Kilner, referring to post-war aviation, said he had sufficient confidence in our designers, pilots and workpeople not to be worried on that score, but he was perturbed about the start of the race and afraid that this country might be caught still putting on its running shoes. Not only so, but he thought we might be forgiven if we sometimes wondered whether the starting pistol had not already been fired before we had begun to change. Our future Empire should be built on the air just as the Empire in the past had been built on the mastery of the sea. Those in authority should look to it that aviation is not made a plaything in politics.

Sir Frederick Bowhill emphasised that the crossing of the Atlantic is not yet the routine affair which one might believe from the thousands of flights that have been made successfully. Every flight still has to be carefully studied and planned beforehand, but with good organisation the Atlantic had been flown day and night, winter and summer, sometimes in the most appalling weather.

Mr. Sidgreaves uttered a warning that unfortunately air transport looked like becoming a political and not a technical issue. Certain things could only be settled in agreement with other nations, such as freedom of air passage, freedom of facilities, and freedom of air trade, but others could and should be settled now. Aviation demanded all the things which a recent civil service report admitted that the civil service lacked: initiative, imagination, enterprise, departure from precedent, and the taking of risks. With too much Government interference these things were likely to be missing. "The red light is beginning to glimmer," Mr. Sidgreaves said, and we should not let it happen for our own sake and for the sake of our children.

JET PROPULSION

RECENT attacks on Southern England by German pilotless jet-propelled aircraft have revived the subject in a somewhat acute form. Doubtless many of our readers will wish to study the many different forms of jets and gas turbines which have been suggested or developed from time to time. They could find no better guide to the subject than the book, *Gas Turbines and Jet Propulsion for Aircraft*, by G. Geoffrey Smith, M.B.E., the third edition of which is now ready and obtainable from our offices, price 6s. net, 6s. 4d. by post.

The third edition has been brought up to date by many additions, including chapters on the working cycle of turbine-compressor units, on the relative merits of jets and airscrews, and on boundary layer control, the latter being a feature with great possibilities but difficult of achievement except in conjunction with jets.

In a foreword to the third edition Sir Geoffrey de Havilland writes: The younger generation is watching the possibilities with eager interest. In this book, and in no other, all the steps leading to the present development are described clearly and with a background of knowledge of the fundamental requirements.

SPITFIRES' EIGHT-TO-ONE VICTORY

THREE Spitfire Squadrons of the R.A.F. Second T.A.F. scored an eight-to-one victory over the *Luftwaffe* a few days ago in one of the biggest fighter engagements so far in the battle of Normandy. Out of a formation of approximately thirty Fw 190s and Me 109s they shot down six Fw 190s and two Me 109s for the loss of one R.A.F. machine, the pilot of which was seen to bale out.

The fight lasted little more than fifteen minutes and the surviving enemy pilots lost no time in taking violent evasive action.

Some of the R.A.F. machines landed at one of the emergency landing strips in Normandy to refuel and rearm.

Behind the Lines

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

Appointed

GENERAL YUN USHIROKU, Deputy Chief of the Japanese Supreme General Staff, has been appointed Chief of the Army Air Force Staff and Inspector-General of the Army Air Force.

Jap Fear

"THE main objective of Japanese operations in China," said the military spokesman of the Japanese Imperial H.Q., "is not only the destruction of the Chungking régime, but is also aimed to thwart American intentions to use the Chinese continent as an extensive airbase for coming large-scale air attacks against Japan proper."

The Rôle of Artillery

"NOT the *Luftwaffe*, but German artillery will be matched against the Allied Air Forces to decide the issue of the invasion," said German military spokesmen, quoted by the Berlin correspondent of *Aftonbladet*. "It is probable that when the first phase of the invasion is over the battle will be primarily one of machines," he quotes them as saying.

It seems that the German High Command are resigned to the *Luftwaffe's* inability to take up the challenge of Allied Air Forces, for, according to their spokesmen, "on the German side artillery will play the chief rôle while the Allies will deploy their Air Forces as their trump card."

Ambulance Aircraft

THE *Skandinavisk Aero Industri A.S.*, of Aalborg, Denmark, has received an order for two ambulance aircraft for the "Zone-Rednings-Korpset" first-aid organisation.

Designated KZ IV and originally designed for passenger transport, the aircraft is a wood-constructed low-wing twin-engined monoplane with a fixed undercarriage and a cabin accommodation for four. The two starboard seats can be replaced by a stretcher.

The KZ IV is powered with two D.H. Gipsy Major engines of 130 h.p. each, and has a span of 52.5ft., a length of 32ft., a height of 8.7ft., and a wing area of 323 sq. ft.

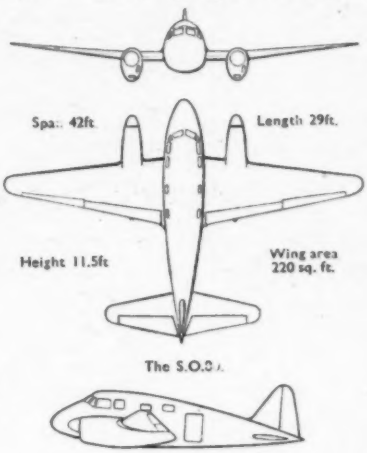
The ambulance version, with a gross weight of 3,734 lb., carries a total useful load of 1,309 lb. Maximum speed is 137 m.p.h., cruising speed 124 m.p.h., and landing 40 m.p.h. Take-off run is 295ft. and landing run 262ft. Range is 560 miles.

Stretching the *Luftwaffe*

CONSIDERABLE German air forces and A.A. units are reported by Swedish sources to have been transferred in recent weeks from Norway to Denmark, presumably for further transfer to the south.

According to these reports there is no German bombing force worth mentioning except in North Norway, while fighters dominate the southern part of that country.

A later report states, however, that frantic efforts are being made to reinforce the *Luftwaffe* in Norway, and preparations have been made at Forneôbu airfield to receive large fighter formations.



Admission

LUTZ KOCH, German radio war correspondent, reported that German officers and soldiers, veterans from Russia, North Africa and Italy, are unanimous in saying that the vicious battle in Normandy is the grimmest fighting they have experienced in this war.

"The scales are tipped in favour of the Allies by their almost overwhelming superiority in men and material. Their superiority in the air and on the sea is also practically unchallenged. Four-engined U.S. bombers hover all day over the battlefield and plaster German communication lines with heavy bombs. At times the German Command is forced in daylight to stop the flow of reinforcements and supplies to the front line and wait till there is a lull in Allied air activity at night."

New Bombs

GERMAN reports state that Allied Air Forces now employ new 20 lb. bombs of a tremendous splinter effect and a larger type of about 110 lb. with a particularly strong blasting effect.

Respectfully Acknowledged

"IT can be stated four days after the beginning of Allied landing operations that their method of attack consists of a series of clever combinations of sea and airborne landings," said the German Broadcasting Service for Europe.

"It is clear that this landing system which, one must admit, has been worked out and elaborated to the most minute detail, is such in type and application that would present the German defence with difficult tactical tasks.

"Fifty to eighty or a hundred freight-carrying gliders jointly carry out an operation, though cases have been observed where gigantic groups of 200 and more of this type of aircraft tried to land their crews and war material of all kinds at critical points in the rear of the coastal defences—attempts undertaken for the first time on that scale. In these cases the German defence was repeatedly compelled to fall back on units available at the nearest spot such as supply, transport and labour services, in order to localise the enemy landing positions, until fighting forces and assault detachments and regular formations were brought up to take up the fight against the enemy formations."

A French Type

THE S.O.80, designed and built by the S.N.C.A. du Sud-Ouest, has for a considerable time been under development as a prototype for further mail carriers.

The S.O.80 "Biarritz" features a metal monocoque fuselage, dual controls and has accommodation for five passengers or 1,100 lb. of mail. All-metal wings, have camber-changing landing flaps with a maximum deflection of 45 deg. and taper sharply on both edges to small, round tips with dihedral from flat centre section. Two fuel tanks of 40 gallons each are housed in the wing centre section, two additional ones in outer panels. The undercarriage is of conventional design and tailwheel is fixed.

Powered with two Béarn 6-D air-cooled six-cylinder engines of 410 h.p. for take-off at 2,900 r.p.m., and driving three-bladed electrically controlled Ratier airscrews, the "Biarritz" has a maximum speed of 280 m.p.h. Cruising speed on 70 per cent. power output is 233 m.p.h. and landing speed with flaps 62 m.p.h. The theoretical ceiling is 29,500ft., take off run 985ft. and range 620 miles.

With an empty weight of 4,210 lb. and a useful load of 2,403 lb., the wing loading of the S.O.80 is 29.9 lb./sq. ft. and power loading is 8.05 lb./h.p.

Of the two production models developed from this prototype, the S.O.90, the only one of its kind, was used by M. Hurel in his escape from France, while the other, the S.O.91, featuring a tricycle undercarriage, is reported to be still in construction.

The S.O.80 "Biarritz" twin-engined French-built mail-carrier is powered with 410 h.p. Béarn 6-D.s and carries five passengers or 1,100 lb. of mail.

Haven't we met before?

"That's right, Sir! I serviced your machine at Lagos last February!"

The aim of Field Aircraft Service is easy to state—*world-wide service.* Not so easy to achieve of course, but we shall get there. In the post-war years, when airlines spread and extend to every corner of the globe (do globes have corners?) certainty of service will be just as important as speed, or comfort. More important we think; for proper servicing on the ground means security in the air. And on security, above all, progress in air transport will depend.

FIELD AIRCRAFT SERVICE

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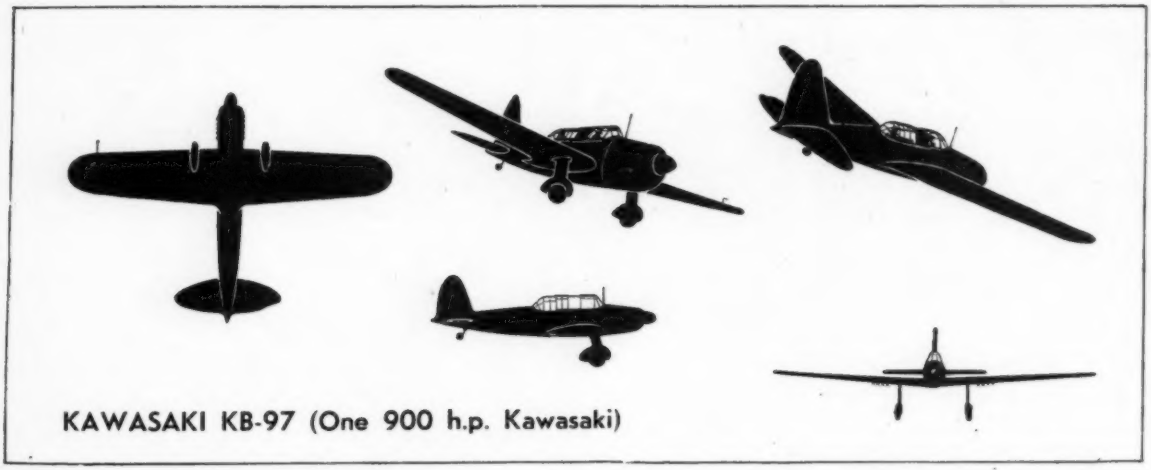
Studies in Recognition

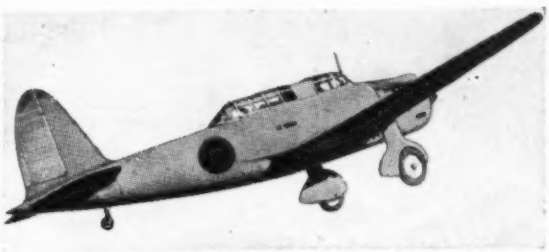
Aircraft in Fl



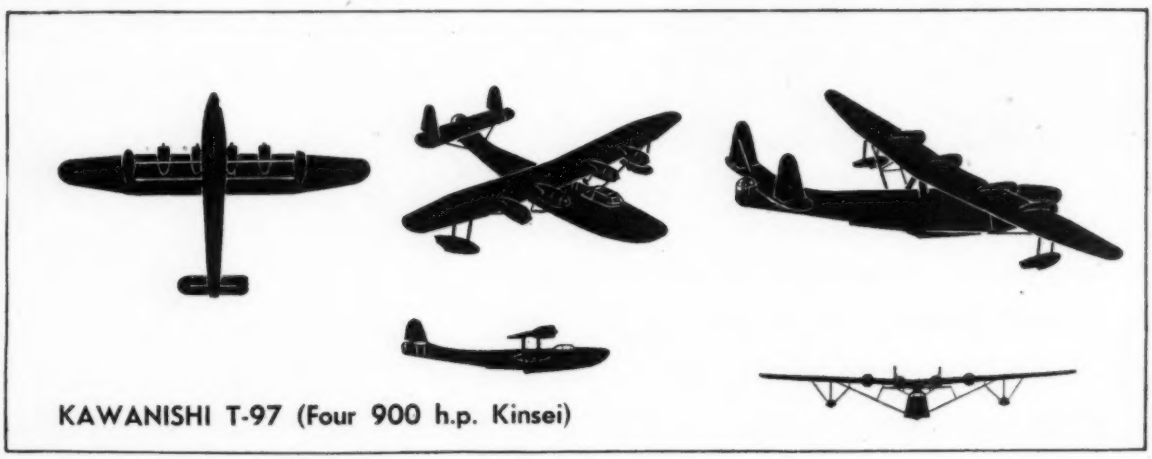
KAWASAKI KB-97 (One 900 h.p. Kawasaki)

THE first monoplane light bomber to be used by the Japanese, the Kawasaki KB-97, is still in service, the latest versions having spats totally enclosing the wheels and a fillet at the base of the fin. The type is powered by a 900 h.p. Kawasaki liquid-cooled, V-type in-line engine and has a top speed of 236 m.p.h. The normal bomb load, internally stowed, can be augmented by the use of wing racks; defensive armament consists of not more than two 7.7 mm. machine guns in the forward fuselage and one in the rear cockpit.

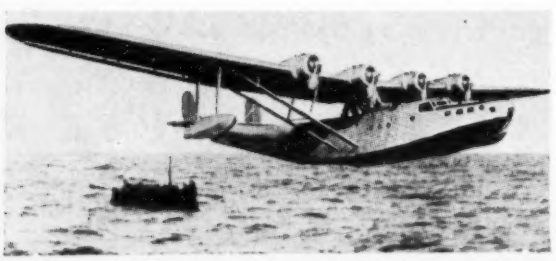
Low wings of moderate aspect-ratio taper only slightly to semi-circular tips and have dihedral from the roots; the tailplane is elliptical. Oval sectioned fuselage has long "glasshouse" and fixed faired cantilever undercarriage. Dimensions: Span 47ft. 8in., length 32ft. 8in., height 12ft. 4in., wing area 295 sq. ft.



Kawasaki KB-97 (Army) Light Bomber.



KAWANISHI T-97 (Four 900 h.p. Kinsei)

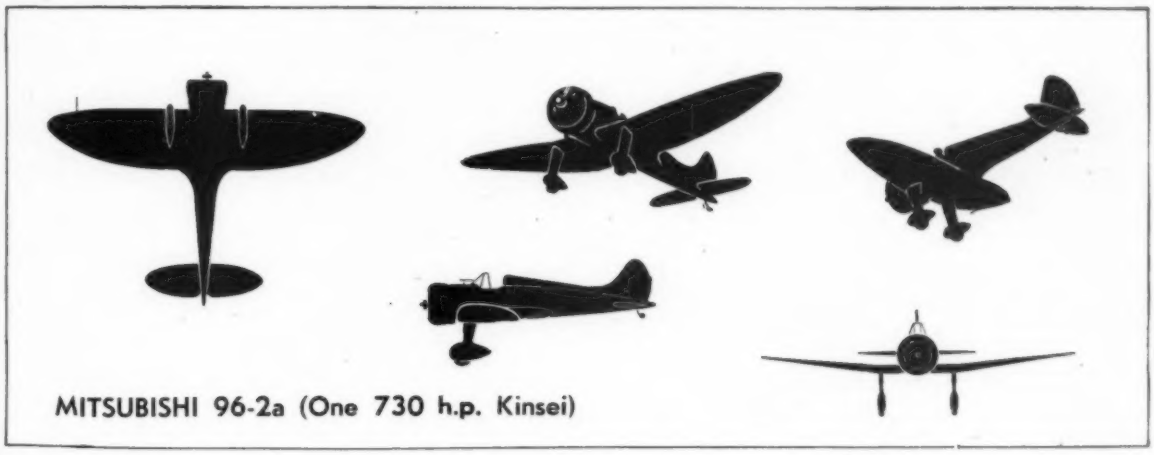


Kawanishi T-97 Reconnaissance.

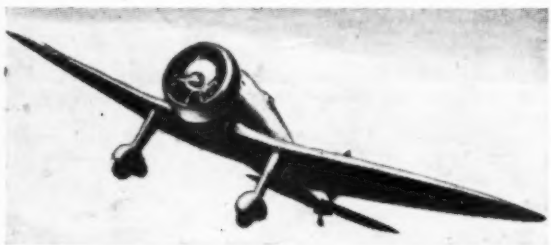
DEVELOPED from a civil type used before the war between Yokohama and Saipan, the Kawanishi T-97 is the larger of the Japanese Navy's two flying boats. Its design owes a great deal to the Sikorsky S-42-B. Intended chiefly for sea reconnaissance duties, it has often been used for bombing during the present war; it can also carry one or more torpedoes, its maximum bomb-load being only 3,500lb. Four 900 h.p. Kinsei radial engines provide the power and its top speed is 215 m.p.h.

The parasol wing is thin and has a wide rectangular centre-section, comparatively short outer panels tapering to round tips; fixed stabilisers are fitted. The strut-braced tailplane is small, has straight, parallel edges and round tips, and carries twin fins and rudders; the tapered, slab-sided hull is shallow and mounts a tail turret. Dimensions: Span 131ft., length 81ft., height 20ft. 6in., wing area 1,900 sq. ft.

Flying Attitudes



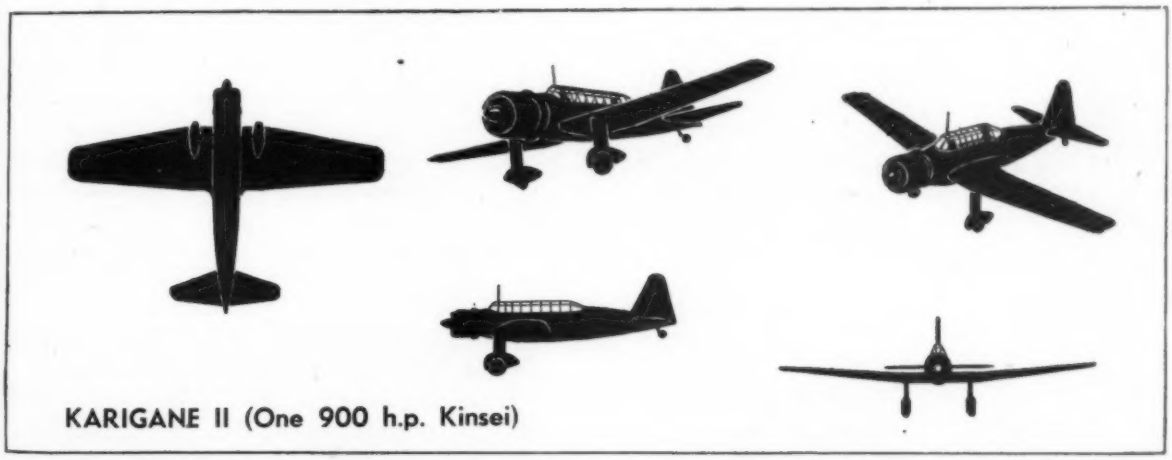
MITSUBISHI 96-2a (One 730 h.p. Kinsei)



Mitsubishi 96-2a (Navy) Fighter.

IMMEDIATE forerunner of the "Zero," the Mitsubishi 96-2a was primarily a single-seater Navy fighter equipped for carrier operation, but it has also been used by the Army both as a fighter and dive-bomber. A few of this type may still be in service against the Chinese where modern U.S. fighters are not likely to be met. Powered by a 730 h.p. Kinsei radial engine (virtually a P. & W.) the top speed is only 250 m.p.h. Armament comprises two synchronised 7.7 mm. machine guns in the fuselage and two more in the wings.

Elliptical wings resembling those of the Spitfire have a flat centre-section on which is mounted the fixed cantilever undercarriage with spatted wheels; the tailplane is also elliptical. Pilot's cockpit is well forward and the head fairing runs back to form a spinal fillet right to the fin. The rounded rudder is wholly above the fuselage tail. Dimensions: Span 36ft., length 24ft., height 10ft. 2in., wing area 141 sq. ft.



KARIGANE II (One 900 h.p. Kinsei)

MODELLED on the Northrop A-17 attack-bomber, the Mitsubishi KB-98 Karigane II is the military version of the civil Karigane, which means "wild goose." The engine is the 900 h.p. Kinsei 14-cylinder two-row radial produced by Mitsubishi from the Twin Wasp Junior design, and top speed is 260 m.p.h., which is quite useful for a light two-seater bomber. Maximum bomb-load is 1,000lb. and armament is three 7.7 mm. machine guns, two in the wings and one in the aft cockpit.

Low wings carry the fixed, faired cantilever undercarriage on a square, flat centre-section, and the outer panels, like the tailplane, taper mostly on the leading edge to square tips; tail fin and rudder with straight taper and round apex; long "glasshouse." Dimensions: Span 39ft. 5in., length 27ft. 11in., height 11ft. 6in., wing area 258 sq. ft.

Mitsubishi KB-98 (Karigane) Light Bomber.

HOME JAMES . . .

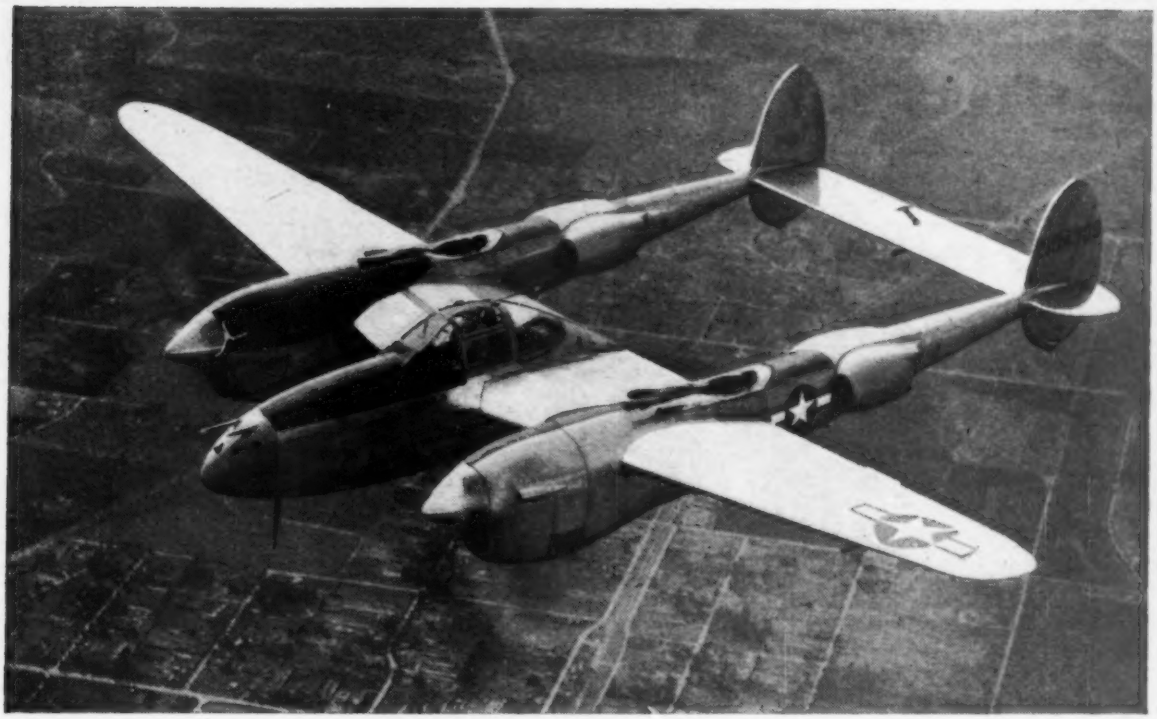
a dark blustering trip . . . occasional sleet and heavy mist . . . visibility poor . . . six hundred miles to go over enemy territory and home seems somehow unreal and fantastic . . . thoughts of engines failing creep into the mind to be laughed away . . . rather weakly ! Then suddenly it is all over and we are back in the mess . . . interrogation finished . . . plane taken over by the ground crew for dispersal and overhaul . . . good old James—he did his stuff all right ! Pity he's got to stay out at dispersal in such thundering bad weather . . . countless damage and maintenance work could be saved by efficient weather protection equipment which would keep the damp away from vital parts of the plane . . . and this is not impossible . . . Healthguard specialise in weather protection equipment for all types of planes under any conditions.

MANUFACTURERS OF AIRBORNE & GROUND EQUIPMENT FOR ALL TYPES OF AIRCRAFT, PARACHUTES & BUOYANCY CLOTHING.

HEALTHGUARD

Lockheed Lightning (P-38/J)

A Review of the Unorthodox Single-seat Twin-engine American Fighter



ONE'S first impression of the Lightning at close quarters is that there seems to be rather a large amount of aircraft for a single-seater machine, and nothing that one sees during a more intensive examination does anything to dispel that initial impression.

As with most present-day machines, the Lightning has since its inception passed through the many vicissitudes of modification; a pointer to the number of models which have had their brief day and passed into the twilight of obsolescence is that the latest type is this, the P-38/J. That is, the sixth in the series of the basic P-38. How many of the individual models in each series have ever got beyond the drawing office or the experimental flight test department I do not know, but since the detailed design of the aircraft started in 1937 it would appear that the people concerned with the machine have been kept pretty busy.

Maiden flight of the first machine, the XP-38, was made in January, 1939, by Col. Ben Kelsey, U.S.A.A.C., who did all the test flying of this aircraft. Allison V-1710/C type engines were employed to drive handed, inwardly-rotating airscrews, and Col. Kelsey broke the cross-country record with this machine. The Army then ordered the usual 13 Limited-Procurement, or Service-Test aircraft, these being designated YP-38. They gave no trouble but were modified to Service requirements. The XP model was considerably over weight, and the YP's were made 1,500 lb. lighter. In addition, the YP's employed outwardly-rotating, handed airscrews, which gave better stability characteristics, and this airscrew installation has been employed on all subsequent models.

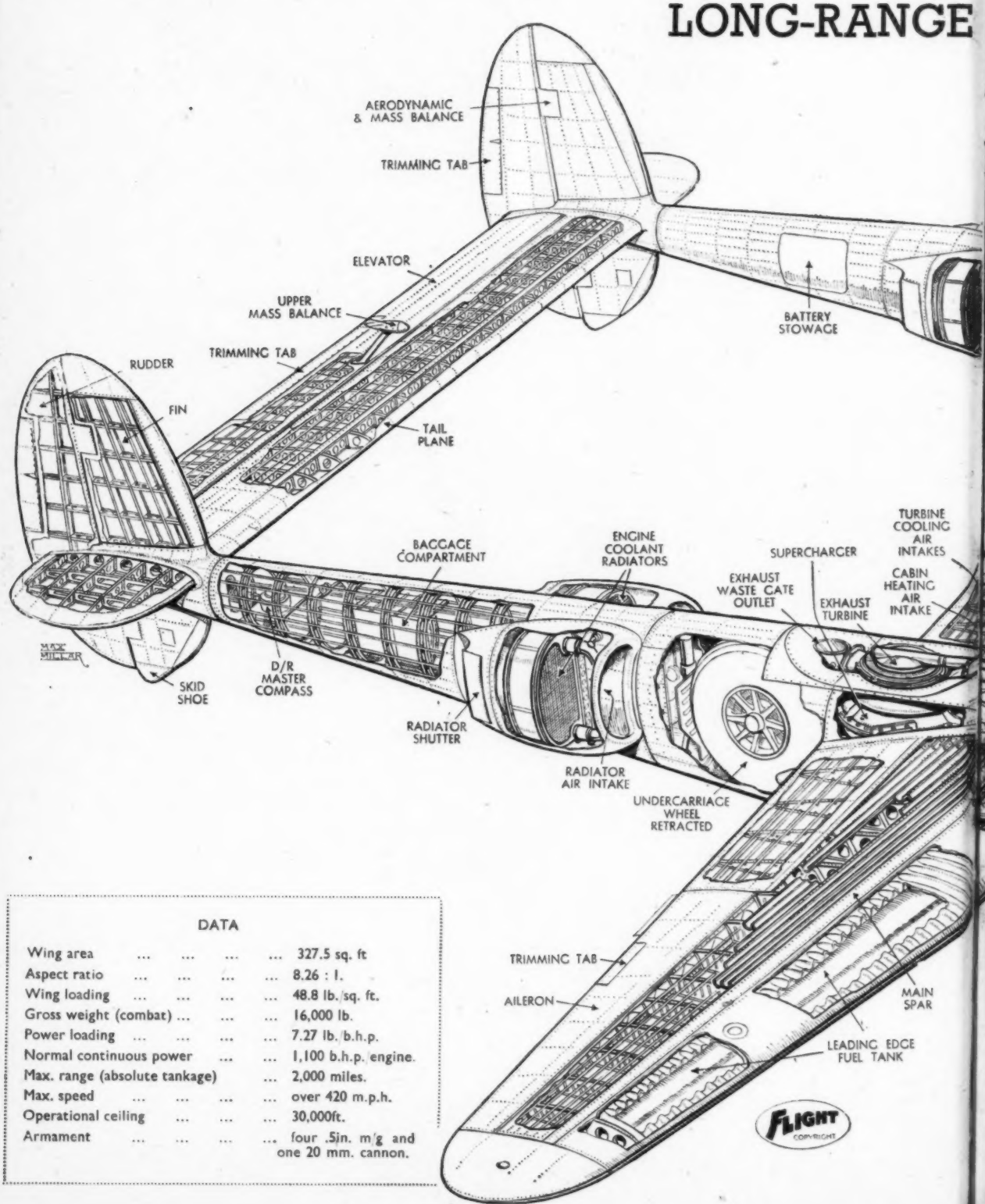
The first actual production model of the Lightning was the P-38/D which appeared in 1941. This was powered with Allison V-1710/27/29 engines and introduced the 20 mm. cannon to supersede the 37 mm. fitted to the X and YP models. The higher rate of fire of the 20 mm. and the use of the H-E shells was found to do as good a job with a smaller weight penalty. The autumn of 1941 brought the P-38/E, among the modifications of which were a re-designed nosewheel-retracting mechanism and revised hydraulic and electrical systems. These machines were followed at the end of the year by the "F" model employing V-1710/49/53 power units with increased boost ratings; these gave 1,325 b.h.p. for take-off, and a better performance at altitude. The P-38/G was introduced early in 1942 and was equipped with V-1710/51/55 engines having further increased ratings; a few of the later "G" types had the "combat" setting for the wing flaps, and this has been a feature of the aircraft ever since. The combat setting gives a small extension and droop of the modified Fowler-type flaps and provides greatly increased lift for very little drag and permits a very high degree of manœuvrability over a wide speed range.

In the summer of 1943 the "H" models appeared. They were fitted with V-1710 engines of a later series giving 1,425 b.h.p. for take-off. These aircraft introduced automatic control of the coolant-radiator shutters and also had a modified electrical system. The end of 1943 saw the inception of the "J" series which, although using the same engines as the "H," had increased ratings to give 1,500 b.h.p. for take-off and a much better performance "upstairs." In the P-38/J was also superseded the wing-leading-edge type intercooler, which had so far held sway, by a radiator-type intercooler beneath each engine, and fuel tanks installed in the leading edges of the wings. Additionally, optical flat bullet-proof front screens were incorporated together with a change from the 3/4-type control wheel to "spectacle" grips.

The Lightning wing, which has aroused a great deal of

LOCKHEED LIGHTNING

LONG-RANGE F

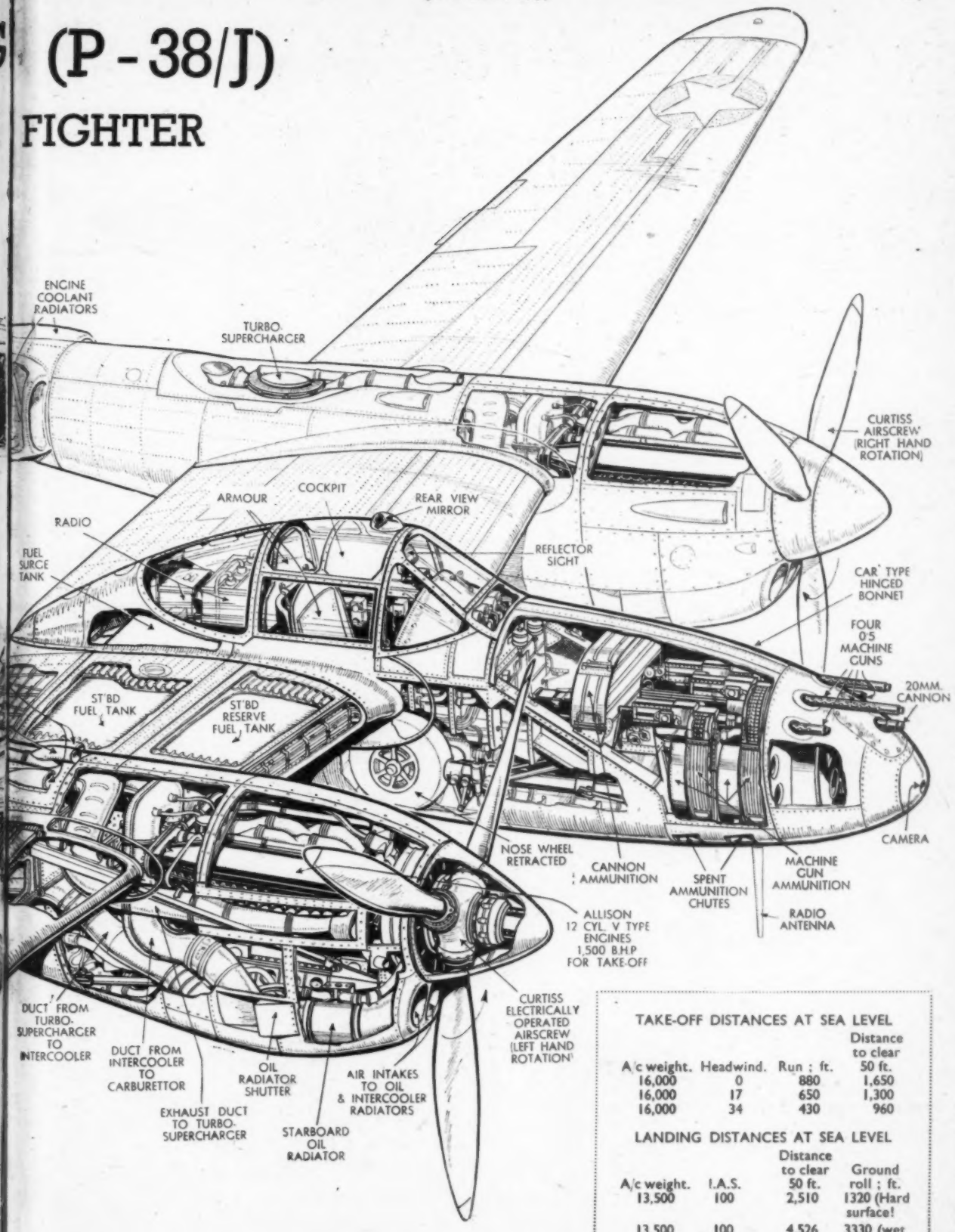


DATA

Wing area	327.5 sq. ft
Aspect ratio	8.26 : 1.
Wing loading	48.8 lb./sq. ft.
Gross weight (combat)	16,000 lb.
Power loading	7.27 lb./b.h.p.
Normal continuous power	1,100 b.h.p. engine.
Max. range (absolute tankage) ...	2,000 miles.
Max. speed	over 420 m.p.h.
Operational ceiling	30,000ft.
Armament	four .5in. m/g and one 20 mm. cannon.

(P-38/J)

FIGHTER



TAKE-OFF DISTANCES AT SEA LEVEL

A/c weight.	Headwind.	Run ; ft.	Distance to clear 50 ft.
16,000	0	880	1,650
16,000	17	650	1,300
16,000	34	430	960

LANDING DISTANCES AT SEA LEVEL

A/c weight.	I.A.S.	Distance to clear 50 ft.	Ground roll ; ft.
13,500	100	2,510	1320 (Hard surface!
13,500	100	4,526	3330 (wet or slippery)

LOCKHEED LIGHTNING

interest in aviation circles, is actually a hybrid type designed by Lockheed to provide high-lift, low-drag properties and, as is now well known, the wing has proved an unqualified success. The twin-boom layout was chosen as a means of providing a light, rigid structure with great stability over a very wide speed range; to give small-unit vertical area by having fins and rudders in each slipstream; and, probably most important of all, to give entirely independent supercharging, oil, coolant and auxiliary systems with consequent reduced vulnerability. This factor is reported to have proved its worth time and again.

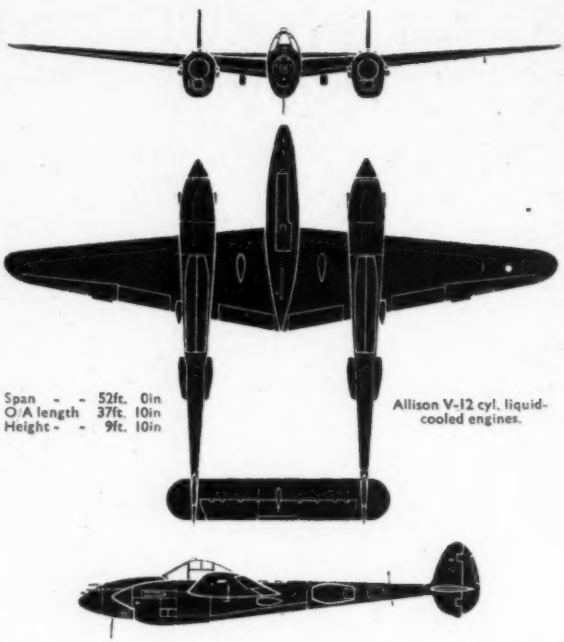
Armament of the Lightning is concentrated in the nose of the pilot's nacelle, and comprises four 0.50in. Browning machine guns and an AN-M2 20 mm. cannon. Grouping the armament like this provides a "column" of fire power as distinct from the "conic" fire pattern obtained from wing-gun installations. A great advantage, which fighter pilots will recognise, is that the reflector sight line and the trajectory of the guns are virtually parallel, and very close together.

Cannon, guns, and ammunition box nesting is very neat indeed. The boxes serving the 0.5s were designed to accommodate 500 rounds each, but this concentration of load in the nose proved too much, and the boxes are now fitted with false bottoms which reduce their capacity to 300 rounds each; 150 rounds of cannon ammunition is carried. Rate of fire of the cannon is 600-700 rounds/min., and of the guns 825 rounds/min. Guns and cannon are electrically heated and electrically fired, solenoids for the latter being fitted direct to the breech mechanism; cocking is done on the ground prior to flight. Belt links and empty cannon shell cases are collected in a box beneath the cannon breech, but links and cases from the 0.5s are evacuated through small chutes emerging on each side of the lower nose cowling.

In the centre of the nose is housed the ciné-camera which is arranged to operate either by itself or synchronously with whatever armament is fired—the cannon can be fired alone or together with the four guns.

The nosewheel strut is mounted beneath the gun emplacement, on a cross-head trunnion with raking side braces

Nosewheel and main undercarriage legs. The scissor-type torque drag links which maintain direction but allow shock absorption motion can clearly be seen.



the cross-beam pivoting in plain bearings between the inner and outer walls of the nose. The spoked, light-alloy wheel with its 27in. dia. tyre is carried on a cantilever axle terminating the overhung bracket of the lower telescopic strut member. The nosewheel, together with the main wheels of the tricycle undercarriage, is hydraulically retracted and lowered.

The cockpit of the Lightning is roomy, comfortable, neat and quite well laid out. The most unconventional aspect of it is the use of a control column on the right-hand side, at the top of which is a horizontal cantilever beam carrying the control "spectacle" grips. This arrangement works well in flight and allows great freedom of leg movement and easy access to various control switches mounted forward. The instrument panel is screened by a black fabric anti-glare hood, the Lynn-3 type reflector sight being mounted above the hood. Forward vision is excellent, surprisingly so in view of the fact that the bullet-proof, front panel is raked at about 27-30 deg. to the horizontal, and the general view is quite exceptional, the seating position being well up towards the wing leading edge. Warm air is ducted from the exhaust cooling shroud and played on the inside of the front screen to prevent ice-formation.

Airscrew Pitch Phasing

On the instrument panel are carried the normal indicators and gauges; it carries in addition two D.R. compasses (one is a stand-by), and warning lights for exhaust-turbo overspeeding. At the base of the fascia panel is a transverse tray carrying on its top and front face various switches, among them the oil dilution switches which control solenoids of cocks which admit petrol to the lubricating oil to facilitate cold starting.

Mixture controls, auto-setting and over-ride, and the airscrew pitch control and throttle levers, are nicely placed on the left hand, a particularly useful refinement being the inclusion of a vernier phasing control governing the starboard airscrew pitch. With this, the pitch levers are adjusted to give the required r.p.m. and phasing of the engines can be rapidly and *exactly* performed by the vernier control. The undercarriage lever is beneath and behind the throttles, whilst forward and at the side is the elevator trim wheel and scale. The starboard side of the "office" forward is given over to circuit-breaker press-buttons for every electrical service in the aircraft. Conveniently mounted behind this panel is the flap control

LET'S RECOLLECT

One of a series of reminiscences from British Aviation history which will appear from time to time in FLIGHT and, it is hoped, prove interesting to readers

A Saturday afternoon at Brooklands. Hardly a week-end passed when one or more of Britain's pre-war aerodromes was not a rendezvous for private-owners, club members and large crowds of faithful enthusiasts who came to enjoy a programme of racing, displays and social intercourse.

HIGH DAYS AND HOLIDAYS

What shall we remember? Record breakers—Bert Hinkler, Jean Batten, Broadbent, Clouston and Ricketts, Alex Henshaw? The Royal Aeronautical Society Garden Party or the Paris Aero Show? The Circuit of Europe, better-known as the "Rundflug" or the Oases Rally from Cairo? The Coupe Deutsch week-ends at Deauville, or the Week End Aerien of 1932 or 1936? The Isle of Man Race, or the Cinque Ports International Rally at Lympne? Saturday afternoons at Brooklands or Heston, a Reading "At Home," the Hatfield or Bristol and Wessex Garden Party? The Dawn Patrol or the Arrival Competition? Winter Sports in Switzerland by Swissair or Puss Moth?

Touring abroad as a private owner, by air taxi or club machine? Or drifting home from Renfrew or Leeming or Norwich or Leicester on a Summer's evening above a drowsy, peaceful England, content after a successful cross-country, a good day's flying and competition with perhaps a cup as evidence of skill? Happy days. In the days to come will the sky be so full of helicopters, lightplanes or transports, rules and regulations, radar and traffic that there will be small room for lazy contentment? Or will the joy of flying always be there?

The organisers of pre-war flying meetings, the pilots and the enthusiasts who thronged the enclosures are to-day engaged on sterner tasks all over the world. But the day will return when every week-end will have its popular air events, attracting thousands of spectators, keeping the great British public informed at first hand of aeronautical developments and creating a demand for the private-owner aircraft in which British designers and constructors excel. The sport of flying may well rank as one of the greatest attractions for post-war pleasure seekers. Who knows? British Aviation Insurance Company policies will then again provide the essential coverage for organisers, entrants, pilots and all who are concerned with flying meetings and displays. From their twenty-five years experience B.A.I.C. staff will also be ready to advise and assist in planning aeronautical events.

THE
BRITISH AVIATION
INSURANCE COMPANY LIMITED
Underwriter and Principal Surveyor: Captain A. G. LAMPLUGH, F.R.Ae.S., M.I.Ae.S., F.R.G.S.
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CANADA—A. G. HAWARD, 500 PLACE D'ARMES, MONTREAL

Ready to start—a Typhoon Fighter-Bomber, loaded up, waits for its next job. [Advt.

LOCKHEED LIGHTNING

lever, and at the right of the seat is the hydraulic emergency hand pump.

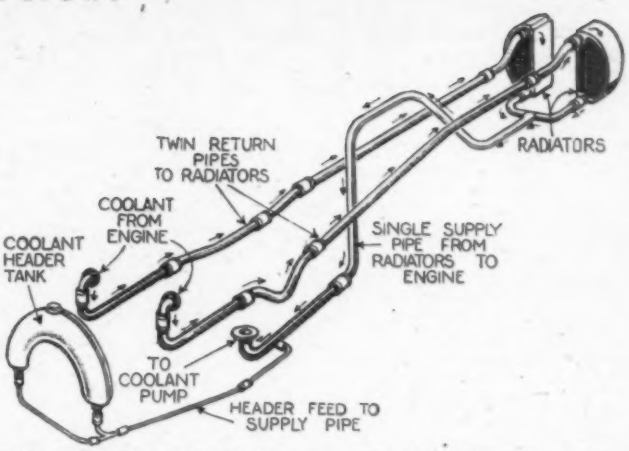
Plate-type rudder pedals are pivoted at the bottom to carrier arms linking up with individual torque tubes. The pedals are adjustable for length of leg by a locking lever at their lower outboard corners; the tops of the pedal plates are connected to the wheel-brake jacks. Despite its apparent simplicity, the usual American aircraft wheel-brake system (to which this conforms) is not so easily mastered nor so capable of fine manœuvre as the standard system in use on R.A.F. machines.

The "spectacle" hand grips for aileron control (forward motion also actuates the elevator, of course) incorporate microphone, cannon and camera buttons in addition to the 0.5's trigger. Aileron trim is effected by a wheel located on the control column beam, and next to it is the rheostat switch for the reflector sight. The seat is fitted with shoulder straps and a lap-type safety belt instead of the Sutton harness found on British types. This arrangement is comfortable and seems effective; it is probably no less efficient than the conventional harness, and it is certainly less bulky and hampering.

Behind the pilot's seat the armour-plating extends downwards only to the top of the main spar, the lower part of the man's back being protected by a curved slab of plate fitted inside the back-rest of the seat.

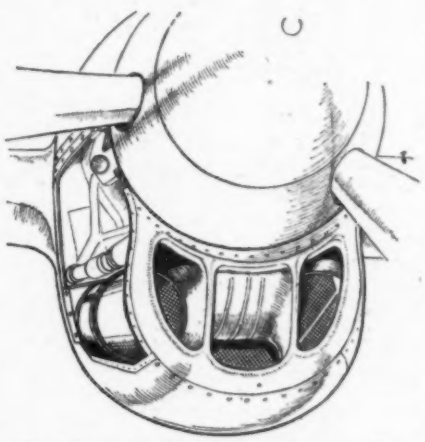
The top of the cockpit hood is hinged at the rear and opens upwards and backwards; if opened whilst in flight it is automatically jettisoned. Each side panel can be lowered at will, rather like a car window, by a small crank handle.

From the top of the main spar, immediately behind the pilot, a flat tray is carried to the after bulkhead; beneath the tray the fuel surge tank is housed, whilst above the tray, in the rear part of the cockpit cover, is carried the radio equipment. The main hydraulic reservoir is housed behind the bulkhead, and at the end of the fuselage is the flap-actuating mechanism. This comprises a piston-cum-swash-plate type hydraulic motor operating a screw jack through reduction gearing with limit switches to regulate the degree of flap incidence selected.



The coolant circuit in each boom comprises twin return lines from each cylinder bank to each radiator, and a common flow line to the engine-driven coolant pump.

Turning to the booms and their load items, the Lightning is equipped with 11ft. 6in. dia. Curtiss-Electric three-bladed, handed airscrews. The engines are of opposite rotation, the port being R.H. and the starboard L.H. Crankshafts of both engines are interchangeable by turning end-for-end, and this is, no doubt, a very valuable production and servicing factor. The reduction gears in each unit are identical.



The intakes beneath each spinner serve the twin oil radiators on each side of the crankcase, the centre intake serving the intercooler housed beneath the crankcase further aft.

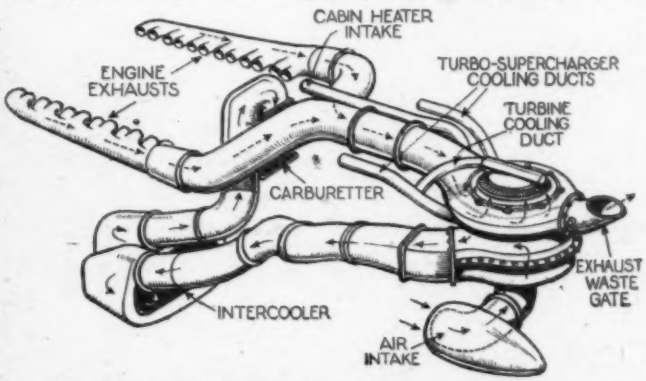
Supercharged Ignition

The power units are carried on light-alloy girders with a triangulated tubular structure which picks up on the main spar. Further support is afforded by a boxed-N type horizontal bracing as the base of the engine mounting. The two oil radiators to each engine are placed on each side of the crankcase forward, with the intercooler beneath the centre of the crankcase farther aft. Oil-cooler flaps have seven controlled settings governed by a thermostatically regulated motor, the thermostat taking the temperature of return oil.

All engine controls, by the way, are cable from the cockpit to the fire walls; forward of the latter control transmission is by push-pull or torsion rod linkages.

Double-Scintilla magnetos are fitted between the cylinder banks and serve two distributors each, one for each bank, the distributors being driven from the rear of each camshaft. An interesting point of this ignition system is that the magneto and distributors are "supercharged" from the turbo-blower duct leading to the carburettor intake. At altitude, rarefied air tends to cause short-circuiting over the points, and by supercharging this is avoided.

All accessories, such as the generator (which is fitted to the port engine only), fuel, hydraulic, coolant and vacuum pumps, are driven from the wheel case at the rear of each engine. The starter is at the lower centre of the wheel case, and for emergency use an inertia starter is also incorporated. Small forward-facing scoops on the cowling serve ducts for sparking-plug and magneto cooling.



In the Lightning the ducting for the turbo-superchargers occupies considerable space. The flow paths from intake, via blower and intercooler, to cylinders is here clearly indicated.

LOCKHEED LIGHTNING

Exhaust gases are collected in a manifold, and this is taken through an outer cooling and insulating shroud to the turbine. The carburettor intake is outboard of each boom, beneath the wing trailing edge, and leads up to the turbo-impellor. From the impellor the forced air flow is ducted forward and down to the intercooler, then up to the carburettor and so into the secondary, gear-driven supercharger. The latter is used primarily to ensure efficient distribution of mixture to the cylinders.

As may be seen from the special drawing, the main undercarriage wheels retract a surprising distance aft. The undercarriage legs are of the telescopic, oleo-pneumatic type and are carried each on a massive cross-member with a radius bracing rod making a triangulated structure. The main wheels are offset on cantilever axles, the centre of the axle length, not the centre of the tyre, being coincident with the centre line of the boom.

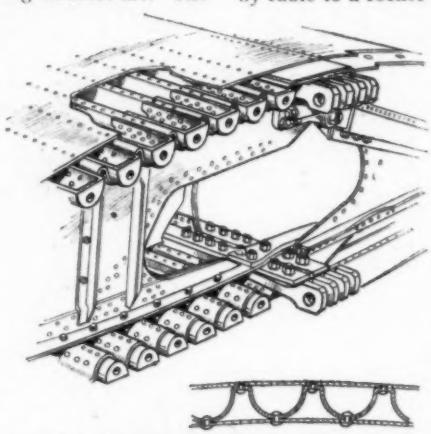
Unusual Brakes

Braking on the main wheels is obtained by an axial hydraulic expander tube which compresses, through a fibre heat insulator, a sandwich of 19 steel rings. Nine of the rings are copper surfaced, the remaining ten being plain steel, and alternate rings are keyed one to the hub and one to the drum. The braking rings are freed by stiff axial return springs when braking pressure is relieved.

A flare chute is mounted on the rear side of the after wheel well bulkhead, and behind this is carried the oxygen bottle; as with most, if not all, American Service types, the operating pressure of the oxygen system is 350 lb./sq. in.

Further aft in each boom are the thermostatic shut-off valves actuating hydraulic jacks which operate the coolant-radiator shutters. The linkage is by simple push-pull rods and bell cranks. This positioning of the radiator far down the booms is a seemingly unnecessary complication, but their bulk could ill be fitted anywhere else, and the efficiency of the system is unquestionable, although the airflow behind these appendages must be pretty chaotic.

The empennage, or tail unit, of the Lightning is a light, rigid structure that at one time and another has been a source of concern to the designers. The tailplane and elevator are of straightforward stressed-skin construction on pressed sheet former ribs, but an unusual element of the latter is that there is no single torque tube as such. There are torque tubes, two of them, in short lengths at each end of the elevator, and each carries a mass balance on a lever arm which moves up and down inside the fin. Elevator control cables are led aft along the boom, round pulleys, up and down inside the fin, round further pulleys and back to the torque tube arm. Between the torque tubes the elevator is carried on eight pin hinges, and in between the hinges the elevator leading edge is D-section to facilitate shrouding.



Sketch of main spar pick-up outboard of booms. The corrugated stiffening is skinned on both sides at fuel tank locations, as shown in the detail.

The construction of the boom ends at the junction of fins and tailplane is very simple but quite ingenious. Open bulkheads in the modified monocoque construction of the booms proper give way to quatrefoil-shaped bulkheads with flanged peripheries, fillets between fins and tailplane picking up on the flanges.

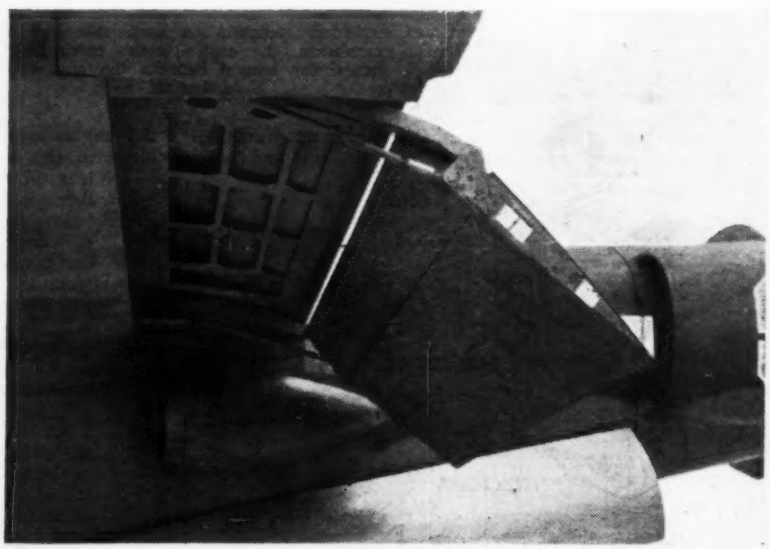
Rudders are constructed in two main parts, one above and one below the fish-tail ends of the booms; the two parts are joined along the rudder trailing edge by an internal fitting. Each rudder is carried on a short post and three pin hinges, as on the elevator, the rudder being attached to the rudder post through short channel-section strips. Mass balances are incorporated inside the aerodynamic horn-balances of each rudder, and movement is transmitted by cable to a rocker beam to which is attached a push-pull rod linking up to a single lever arm projecting outboard from the rudder post.

The fins are also each in two main parts which are joined to the quatrefoil section of the boom ends. The construction is quite conventional, as may be seen from the drawing.

The wing structure of the Lightning is rather a complicated one, and, presumably, this has been the natural result of the basic layout of the aircraft. The wing can be broken down into the separate elements of centre section and outer panels, which are built up round the main and rear spars. The main spar is a double-I-beam box extending to the outboard sides of the twin booms; from there it becomes a single I-beam member throughout the length of the outer wing panel. The transition pick-up is by four lugs top and bottom and $\frac{1}{2}$in. diameter high-tensile steel pins.

The rear spar is a shallow channel-section member made up as a two-thickness sandwich with reinforcing pieces at the pick-up points. This spar extends only to the aileron, from where outboard stiffening is provided by a raking web between the upper and lower wing surfaces at the aileron shroud.

(Continued on page 674.)



This shows the extension and droop of the special Fowler type wing flaps. These flaps, at a combat setting, are chiefly responsible for the Lightning's amazing manoevrability.

The Case for the Railways

Some Reminders of What Railway Air Services, Ltd. Have Done in the Past, and an Outline of What They are Preparing to do After the War

By J. ELLIOT

IN the post-war days, when the public will demand the most comprehensive system of transport by road, rail, air or sea, the railway companies are ready to do their utmost to co-ordinate all new methods of transport with those they already employ, but not to subordinate one to the other. They should be complementary.

Channel Islands Airways was a case in point. The Great Western and Southern Railways ran the steamers and the air line. Both services were available to the public on the one ticket, if desired. Both offered the finest service available, with the best modern equipment. Luggage belonging to air passengers could be sent in advance by rail and steamer. Air passage could be arranged at any railway station in the country. That is the way we visualise the air and surface routes working to the Continent after the war. Our motto will be "give the public the best of both."

In the last century the railway companies were early in the field in providing short-distance steamships to take train passengers to Ireland, the Channel Isles and the Continent, and at the beginning of this war they owned as many as 130 vessels. Forty of these routes were operated, and millions of passengers and thousands of tons of freight were carried.

THE offer of the Railway Companies to provide, without subsidy, comprehensive air services between Great Britain and the Continent and within the United Kingdom after the war is of such importance to the future of civil aviation that FLIGHT has asked Mr. J. Elliot, who is deputy general manager of the Southern Railway and a director of Railway Air Services, to elaborate in more detail the position which could only be briefly outlined by Lord Kennet, a director of the Southern Railway, in his recent speech in the House of Lords. Mr. Elliot visited the United States in 1935 to study air line development there, and has been in the railways air "team" since its early days.

By the end of the last war a vigorous new means of transport, the petrol-engined vehicle, started to develop very rapidly, but when in 1921 the railway companies sought Parliamentary powers to run public road vehicles, this permission was refused, it being widely stated at the time that the railways sought such powers in order to strangle the new form of transport. In due course (1928) the railways obtained their powers, whereupon the critics (among them the same people who had opposed them in 1921) asked why the railways had taken so long to wake up to the fact that they ought to use and develop this growing form of transport in conjunction with the rail! A similar situation should not be allowed to develop with civil aviation and the railways to-day.

Dovetailing of Services

Having obtained road powers, the railways did not compete with the existing road companies by subsidising buses at uneconomic prices from their railway earnings. Instead they invested in road companies already widely experienced in this form of transport, at the same time doing what they could to dovetail the rail and road services and provide interchangeable facilities so that the best of both forms of transport might be available to the public. The ruinous effect of cut-throat competition was thus avoided.

There is one thing only which, in the long run, really counts, and that is the support of the public. The railways, after many years, know well that unless the public are well served and are given what they want, no commercial enterprise can survive. The changeover from steam to electricity, tramcars to trolley buses, regardless of opposition, has been successful because it is impossible to arrest progress. So it will be in the air.

The railways, in offering greater air services, are taking the long view, in which they look not for immediate, but ultimate, rewards, and anyone genuinely interested in civil aviation, and who is opposed to the railways running such services, should ask himself whether it is not better that the railways, with all their transport knowledge and organisation here and on the Continent and their very high standards of safety and discipline, should not help to develop air transport rather than be forced to range themselves on the side of those opposed to it.

Owing to the comparatively small size of these islands, internal air services before the war were only of value to a limited extent, but this will grow, particularly across water. Nevertheless, the railways' air services, which were associated with a number of other air companies, covered most of Great Britain, with particular emphasis on such points as the Isle of Man, Scottish Isles, Ireland, Scilly Isles, Channel Islands, where previously it had been possible only to use rail and sea. The rail-sea-air group offered all-in service, and that is our aim for post-war.

Air services to the Continent were not provided by the railways, as it would have meant competing with the subsidised Imperial Airways and foreign companies, which could only have been done on the most profitable of their routes. That is not giving real service at all.

The railways are, even in wartime, still running internal air services for the Air Ministry, and since 1940 have carried more than 200,000 passengers and over 5½ million lb. of urgent mail and cargo, mostly across water, to Ireland, Scottish Isles, Isle of Man, Isles of Scilly, and so on. They had invested over half a million pounds in their air companies before the war, and in addition incurred £300,000 on development.

The Railways Acts enable them to offer air services to include the British Isles and Western Europe as far as a line taken roughly from Stockholm to Budapest. Beyond Europe they do not seek to participate, as they feel that really long-distance air services fall into another category and involve an entirely different technique. The railways can have no place in air services to countries which they did not previously serve by their Continental surface routes, and to which they did not have through-booking arrangements.

THE CASE FOR THE RAILWAYS

Their offer is made on the assumption that they should not have to compete with any air lines, British or foreign-owned, to which subsidies are granted. In other words, no favours, all to be treated alike.

They operate under Acts which give the Secretary of State for Air unique control, as he may at any time hold an enquiry if it is suggested that the railways are not exercising their air powers properly. The results of this enquiry can be reported to Parliament. This is a control to which no other operating company is subjected and the railways have no quarrel with it.

We have always been willing to co-operate with others in the same line of business as ourselves and have offered air partnership with, for example, short-distance shipping lines which ran regular services between this country and the Continent, and which have valuable experience to offer to air transport. This co-operation already exists between us and shipping lines such as Coast Lines, Ltd., Isle of Man Steam Packet Co., etc.

Finally, I want to emphasise that the vast resources and experience of the railway companies which have been interested in road, shipping and air as well as electric, steam and diesel rail transport for so long, together with their network of agencies, will enable them to offer unrivalled service to future commercial flying. We shall have a first-rate team of men brought up and trained in aviation to run the service. We already have Mr. D. H. Handover, lately traffic director of B.O.A.C., and Imperial Airways, as air adviser to the railways; Wing-Commander A. H. Measures, late of Imperial Airways, as superintendent; Captain G. P. Olley as his deputy, and Wing-Commander Lord Amherst, now with the R.A.F.

Birthday Honours

LAST week we published the names of a number of recipients of honours on the occasion of the birthday of His Majesty the King. Lack of space prevented us from giving them all, and below is a further list.

A. Rowland Smith, K.C.B.

KNIGHT BACHELOR

Alexander Rowland Smith, Managing Director and Controller, Ford Motor Co., Ltd.

ROYAL AIR FORCE

Air Force Cross

(*Continued from p. 631.*)

P/O. R. Allen, R.A.F.V.R.; P/O. N. C. Blackband, R.A.F.V.R.; P/O. K. J. Marshall, R.A.F.V.R.; P/O. A. Mathieson, R.A.F.V.R.; P/O. H. O'Neill, R.A.F.V.R.; P/O. H. K. Richardson, R.A.F.

W/O. G. S. Batchelor, R.A.F.V.R.; W/O. C. F. Blake, R.A.F.V.R.; W/O. L. S. Dimaresq, R.A.F.V.R.; W/O. E. Minter, R.A.F.V.R.; W/O. G. F. Turnbull, R.A.F.V.R.

Air Force Medal

Flt. Sgt. D. Clarke, R.A.F.V.R.; Flt. Sgt. W. C. Dallimore, R.A.F.V.R.; Flt. Sgt. T. G. A. Davis, R.A.F.V.R.; Flt. Sgt. T. W. Donoghue, R.A.F.; Flt. Sgt. R. C. Dunlop, R.A.F.V.R.; Flt. Sgt. G. H. Griggs, R.A.F.; Flt. Sgt. C. M. Houghton, R.A.F.V.R.; Flt. Sgt. M. McGinley, R.A.F.; Flt. Sgt. F. Myers, R.A.F.V.R.; Flt. Sgt. G. Rollings, R.A.F.; Flt. Sgt. R. D. Smart, R.A.F.V.R.; Sgt. A. G. Burton, R.A.F.V.R.; Sgt. J. C. Sheppard, R.A.F.V.R.; Sgt. A. J. Sutton, R.A.F.; Sgt. D. B. E. Weller, R.A.F.; Cpl. W. A. J. Richards, R.A.F.; L.A/C. L. W. Ashton, R.A.F.V.R.

D.S.C.

Lt. Cdr. (A.) A. Jex-Blake Forde; Lt. (A.) A. G. Blanchard.

ORDER OF THE BRITISH EMPIRE

M.B.E. (Military Division)

Lt. Cdr. (A.) G. H. Bates, R.N.V.R.; Lt. Cdr. (A.) W. A. J. Street, R.N.V.R.; Lt. (A.) G. A. W. Goodwin, R.N.; Lt. (A.) B. Sinclair, R.N.

ROYAL AIR FORCE

K.B.E. (Military Division)

Air Vice-Marshal William Tyrrell, R.A.F.

C.B.E. (Military Division)

Air Vice-Marshal R. M. Foster, R.A.F.; Air Vice-Marshal F. F. Inglis, R.A.F.; Air Vice-Marshal C. E. V. Porter, R.A.F.; Air Comdre. T. G. Bowler, R.A.F.; Air Comdre. O. E. Carter, R.A.F.; Air Comdre. K. B. B. Cross, R.A.F.; Air Comdre. H. G. Crowe, R.A.F.; Air Comdre. T. Fawdry, R.A.F.; Air Comdre. R. G. Hart, R.A.F.; Air Comdre. A. MacGregor, R.A.F.; Air Comdre. H. J. Roach, R.A.F.; Air Comdre. C. A. Stevens, R.A.F.

Air Comdre. F. N. Trinder, R.A.F.; Air Comdre. T. A. Warne-Browne, R.A.F.; Air Comdre. H. G. White, R.A.F.; Air Comdre C. D. C. Boyce, R.A.F.; Air Comdre. H. A. Constantine, R.A.F.; Air Comdre. L. Dalton-Morris, R.A.F.; Air Comdre. J. S. Griffiths, R.A.F.; Air Comdre. T. G. Pike, R.A.F.; Air Comdre. W. W. Straight, A.A.F.; Grp. Capt. M. C. Collins, R.A.F.; Grp. Capt. A. E. Dark, R.A.F.; Grp. Capt. J. C. Foden, R.A.F.; Grp. Capt. T. P. Gleave, R.A.F.; Grp. Capt. D. McC. Gordon, R.A.F.; Grp. Capt. J. W. Jean, R.A.F.; Grp. Capt. J. Marsden, R.A.F.

Grp. Capt. T. G. Skeats, R.A.F.; Grp. Capt. E. F. Waring, R.A.F.; Grp. Capt. H. Dawes, R.A.F.; Grp. Capt. H. Eeles, R.A.F.; Grp. Capt. A. F. Johnson, R.A.F.; Grp. Capt. M. W. Nolan, R.A.F.; Grp. Capt. C. J. S. O'Malley, M.B., B.S., R.A.F.; Grp. Capt. W. E. V. Richards, R.A.F.; Grp. Capt. Richardson, R.A.F.; Grp. Capt. F. J. Taylor, R.A.F.O.

Air Comdre. H. F. De La Rue, R.A.A.F.

Air Comdre. J. L. Findlay, R.N.Z.A.F.

O.B.E. (Military Division)

Grp. Capt. A. D. Ross, R.C.A.F.; Wing Cdr. P. Allerston, R.A.F.; Wing Cdr. J. Beaumont, R.A.F.; Wing Cdr. W. H. Biddell, R.A.F.; Wing Cdr. G. Blinman, R.A.F.; Wing Cdr. F. G. Carle, R.A.F.; Wing Cdr. O. C. Cassells, R.A.F.V.R.; Wing Cdr. F. H. Catton, R.A.F.; Wing Cdr. J. Connell, R.A.F.; Wing Cdr. G. R. A. Deacon, R.A.F.; Wing Cdr. D. L. G. Douglas, R.A.A.F.; Wing Cdr. A. R. F. de Salis, R.A.F.; Lt. Col. C. M. S. Gardner, S.A.A.F.; Wing Cdr. R. D. Gough, R.A.F.; Wing Cdr. H. M. C. Harwood, R.A.F.; Wing Cdr. E. R. Hoare, R.A.F.; Wing Cdr. W. R. John, R.A.F.V.R.

Wing Cdr. J. Kemper, R.A.F.O.; Wing Cdr. C. D. Kershaw, A.A.F.; Wing Cdr. A. N. Kingwill, R.A.F.O.; Lt. Col. N. A. McGregor, S.A.A.F.; Wing Cdr. A. P. Morley, R.A.F.V.R.; Wing Cdr. G. H. Morley, R.A.F.; Wing Cdr. T. E. Price, Rhodesian Air Askari C.; Wing Cdr. D. F. Rixon, R.A.F.; Wing Cdr. C. A. Rumball, R.A.F.; Grp. Capt. F. Rump, R.A.F.; Wing Cdr. W. Squires, R.A.F.; Grp. Capt. C. R. Taylor, R.A.F.; Wing Cdr. R. F. Aitken, R.A.F.; Wing Cdr. E. W. Anderson, R.A.F.V.R.; Wing Cdr. C. E. Banks, R.A.F.V.R.; Wing Cdr. G. L. Blake, R.A.F.O.

Wing Cdr. P. Brown, R.A.F.; Wing Cdr. R. K. Budge, R.A.F.V.R.; Wing Cdr. H. Cadman, R.A.F.; Wing Cdr. H. V. Campbell, R.A.F.V.R.; Wing Cdr. R. W. Christmas, R.A.F.; Wing Cdr. A. C. P. Clayton, R.C.A.F.; Wing Cdr. L. S. N. B. Faulkner, R.A.F.V.R.; Wing Cdr. P. D. Finn, R.A.F.V.R.; Wing Cdr. M. J. Grennan, R.A.F.; Wing Cdr. A. Hall, R.A.F.; Wing Cdr. J. H. Lapsley, R.A.F.; Wing Cdr. W. A. J. Lawrence, R.A.F.V.R.; Wing Cdr. P. W. Loveday, R.A.F.V.R.

Wing Cdr. K. G. Major, R.A.F.; Wing Cdr. H. A. Meredith, R.A.F.V.R.; Wing Cdr. D. D. Millar, R.C.A.F.; Wing Cdr. A. W. Millson, R.A.F.; Wing Cdr. A. S. Orr, R.A.F.V.R.; Wing Cdr. R. C. Rotherham, R.A.F.; Wing Cdr. J. Scrimgeour, A.A.F.; Wing Cdr. M. V. Spurway, R.A.F.O.; Wing Cdr. G. C. Tidd, R.A.F.; Wing Cdr. H. L. Whitlock, R.A.F.; Wing Cdr. A. L. Whittaker, R.A.F.; Wing Cdr. D. J. Wiseman, R.A.F.V.R.; Sqn. Ldr. C. M. Crothers, R.A.F.V.R.; Sqn. Ldr. V. C. Jarvis, R.A.F.; Sqn. Ldr. J. Lee, R.A.F.; Sqn. Ldr. E. H. Mallia, R.A.F.V.R.; Sqn. Ldr. C. W. Mayhew, R.A.F.V.R.; Sqn. Ldr. H. Murray, R.A.F.

Sqn. Ldr. M. A. Newnham, R.A.F.V.R.; Sqn. Ldr. B. P. Young, R.A.F.; Sqn. Ldr. H. Adcock, R.A.F.V.R.; Sqn. Ldr. C. H. Baker, R.A.F.; Sqn. Ldr. A. Banister, R.A.F.V.R.; Sqn. Ldr. A. C. H. Barchard, R.A.F.V.R.; Sqn. Ldr. E. S. Brown, R.A.F.; Sqn. Ldr. W. G. Clegg, R.A.F.V.R.; Sqn. Ldr. J. C. Crockard, R.A.F.; Sqn. Ldr. J. J. Dennis, R.A.F.; Sqn. Ldr. R. H. Francis, R.A.F.V.R.; Sqn. Ldr. R. E. D. Greet, R.A.F.V.R.; Sqn. Ldr. F. N. Hargreaves, R.A.F.V.R.; Sqn. Ldr. H. Priestley, R.A.F.V.R.; Sqn. Ldr. F. E. Ratcliffe, R.A.F.; Sqn. Ldr. E. F. W. Truscott, R.A.F.V.R.; Sqn. Ldr. F. S. Turner, R.A.F.; Sqn. Ldr. A. A. Willis, R.A.F.V.R.; Sqn. Ldr. D. Evans, S. Rhodesian A.F.; Sqn./O. J. A. Williams, W.A.A.F.

Grp. Capt. H. A. Winneke, R.A.A.F.; Wing. Cdr. S. F. Reid, R.A.A.F.

M.B.E. (Military Division)

Sqn. Ldr. G. W. Jordan, R.A.F.; Sqn. Ldr. H. Tilzey, R.A.F.; Flt. Lt. T. W. A. Allen, R.A.F.; Flt. Lt. S. Baker, R.C.A.F.; Flt. Lt. S. W. Bryant, R.A.F.V.R.; Flt. Lt. C. C. Cholmondeley, R.A.F.V.R.; Flt. Lt. W. A. Claydon, R.A.F.; Sqn. Ldr. E. W. Davis, R.A.F.; Flt. Lt. J. R. Duncan, R.A.F.V.R.; Flt. Lt. R. A. P. Fison, R.A.F.V.R.; Flt. Lt. C. R. Heazlewood, R.A.F.V.R.; Flt. Lt. M. G. T. Hewlett, R.A.F.V.R.; Flt Lt. A. E. Kuring, R.A.A.F.; Flt. Lt. R. T. Morison, R.A.F.V.R.; Flt Lt. J. Parry, R.A.F.V.R.; Sqn. Ldr. S. N. Pike, R.A.F.V.R.; Flt. Lt. D. J. N. Rebbeck, R.A.F.; Flt Lt. W. H. P. Smith, R.A.F.; Sqn. Ldr. C. J. Van Den Bergh, R.A.F.V.R.; Flt. Lt. D. O. Williams, R.A.F.V.R.; Flt. Lt. A. J. Wilson, R.A.A.F.; Flt. Lt. P. C. Wright, R.A.F.;

BIRTHDAY HONOURS

Flt. Lt. F. V. Armstrong, R.A.F.; Sqn. Ldr. R. Banks, R.A.F.V.R.; Flt. Lt. F. W. Burchell, R.A.F.V.R.; Flt. Lt. M. E. M. Day, R.A.F.V.R.; Flt. Lt. W. S. Dundas, R.A.F.V.R.; Flt. Lt. A. Evans, R.A.F.V.R.; Sqn. Ldr. J. S. Geary, R.A.F.V.R.; Flt. Lt. R. Girvan, R.A.F.V.R.; Flt Lt. H. J. Griffiths, R.A.F.V.R.; Flt. Lt. W. C. Hawken, R.A.F.; Flt. Lt. H. Holme, R.A.F.; Sqn. Ldr. H. H. Horsham, R.A.F.; Flt. Lt. E. L. Jones, R.A.F.V.R.

Flt. Lt. W. Kilvington, R.A.F.V.R.; Flt. Lt. C. W. Layton, R.A.F.; Flt. Lt. A. J. Litchfield, R.A.F.V.R.; Flt. Lt. A. E. Mitchell, R.A.F.; Flt. Lt. J. W. McCombie, R.A.F.; Flt. Lt. L. M. Pankhurst, R.A.F.; Flt. Lt. G. Perry, R.A.F.; Flt. Lt. N. G. Quenet, R.A.F.V.R.; Flt. Lt. N. Radley, R.A.F.; Flt. Lt. R. Revill-Johnson, R.A.F.V.R.; Flt. Lt. Rawel Singh, I.A.F.; Flt. Lt. E. G. Thorpe, R.A.F.V.R.; Flt. Lt. H. L. Warner, R.A.F.V.R.; Flt. Lt. F. G. Weston, R.A.F.; Flt. Lt. C. T. White, R.A.F.; Flt. Lt. D. C. Young, R.A.F.V.R.

F/O. F. F. J. Butler, R.A.F.; F/O. G. M. L. Goodall, R.A.F.V.R.; F/O. P. F. Hudson, R.A.F.; F/O. D. A. Inglis, R.A.F.V.R.; F/O. G. P. H. Munro, R.A.F.V.R.; F/O. J. P. W. Pollard, R.N.Z.A.F.; F/O. M. C. M. Vaughan, R.A.F.; F/O. E. D. Watkins, R.A.F.V.R.; F/O. F. T. Johnson, R.A.F.V.R.; W/O. W. A. T. Anderson, R.A.F.; W/O. M. Berenson, R.C.A.F.; W/O. S. W. Bryant, R.A.F.; W/O. C. Chandler, R.A.F.; W/O. H. N. Chislett, R.A.F.; W/O. J. E. Cooper, R.A.F.; W/O. W. Crosland, R.A.F.; W/O. J. Duncan, R.A.F.

W/O. R. H. B. Gamble, R.A.F.; W/O. J. L. Jarvis, R.A.F.; W/O. G. Jefferson, R.A.F.; W/O. R. Lee, R.A.F.; W/O. S. A. Lucksford, R.A.F.; W/O. J. R. Macdonald, R.A.F.; W/O. F. E. Perryman, R.A.F.; W/O. T. F. Russell, R.A.F.; W/O. E. C. Simmens, R.A.F.; W/O. K. Smith, R.A.F.; W/O. V. A. Stanley, R.A.F.; W/O. A. E. Stevens, R.A.F.; W/O. W. J. Towner, R.A.F.; W/O. C. E. Waite, R.A.F.; W/O. A. Ward, R.A.F.; W/O. C. W. Kidby, R.A.F.; W/O. W. A. McGilp, R.A.F.; F/O. N. M. Evans, W.A.A.F.; F/O. M. Hodgson, W.A.A.F.; F/O. B. Pemberton, W.A.A.F.; F/O. G. M. Shadbolt, W.A.A.F.; W/O. C. McLaughlin, W.A.A.F.

Sqn. Ldr. W. M. Higgins, R.A.A.F.; Sqn. Ldr. P. V. Feltham, R.A.A.F.; Flt. Lt. A. J. Relf, R.A.A.F.

Flt. Lt. J. B. Dickey, R.N.Z.A.F.; Flt. Lt. W. J. Fyfe, R.N.Z.A.F.

ORDER OF THE BATH

C.B. (Military Division)

Air Marshal W. A. Bishop, V.C., R.C.A.F.; A.V-M. E. W. Stedman, R.C.A.F.

ROYAL CANADIAN AIR FORCE

C.B.E. (Military Division)

A.V-M. A. T. N. Cowley, R.C.A.F.; A.V-M. G. V. Walsh, R.C.A.F.; Air Comdre. D. Iron, R.A.F.; Grp. Capt. W. F. Hanna, R.C.A.F.

O.B.E. (Military Division)

Wing Cdr. T. F. Cooper, R.C.A.F.; Wing Cdr. F. H. Smith, R.C.A.F.; Wing Cdr. A. R. Tilley, R.C.A.F.; Wing Cdr. H. B. Wood, R.C.A.F.; Wing Cdr. E. Blake, R.A.F.

M.B.E. (Military Division)

Wing Cdr. S. A. Allan, R.C.A.F.; Wing Cdr. J. M. L. Emard, R.C.A.F.; Wing Cdr. I. N. McKinnon, R.C.A.F.; Wing Cdr. H. Pearce, R.C.A.F.; Wing Cdr. H. L. Wright, R.C.A.F.; Sqn. Ldr. E. A. Blanchard, R.C.A.F.; Sqn. Ldr. D. M. Bruser, R.C.A.F.; Sqn. Ldr. S. R. Burbank, R.C.A.F.; Sqn. Ldr. K. C. Cameron, R.C.A.F.; Sqn. Ldr. D. F. Manders, R.C.A.F.; Sqn. Ldr. H. C. Shaw, R.C.A.F.; Sqn. Ldr. K. W. Walton, R.C.A.F.; Sqn. Ldr. A. P. Whalen, R.C.A.F.; Flt. Lt. R. J. Axcell, R.C.A.F.; Flt. Lt. W. H. Corkill, R.A.F.V.R.; T. Lt. G. W. Delaney, R.A.F.V.R.; F/O. M. C. Northwood, R.C.A.F. (Women's Div.); Flt. Lt. J. R. V. Tremaine, R.C.A.F. W/O. Cl. I J. H. Cooper, R.C.A.F.; W/O. I. W. McD. Day, R.A.F.; W/O. F. Fraser, R.A.F.; W/O. H. E. P. Gray, R.A.F.; W/O. Cl. I J. A. Silver, R.C.A.F.; W/O. Cl. 1 I. M. Squirk, R.C.A.F.; W/O. Cl. II L. J. Stratton, R.C.A.F.

ROYAL RED CROSS

AIR AWARDS

Associates of the Royal Red Cross

Matron J. E. C. Porteous, R.C.A.F.; Nursing Sister M. J. Cleary, R.C.A.F.

D.F.C.

In recognition of gallantry and devotion to duty in the execution of air operations:—

Flt. Lt. R. M. Aldwinckle, 10 (R.C.A.F.) Sqn.; Flt. Lt. J. P. B. Dale, 10 (R.C.A.F.) Sqn.); Flt. Lt. L. A. Draper, 113 (R.C.A.F.) Sqn.; Flt. Lt. B. A. Murray, 10 (R.C.A.F.) Sqn.; F/O. G. E. Francis, 113 (R.C.A.F.) Sqn.; F/O. T. Fraser, 113 (R.C.A.F.) Sqn.; F/O. P. G. Hughes, 10 (R.C.A.F.) Sqn.; P/O. R. W. Beamish, 10 (R.C.A.F.) Sqn.; P/O. A. M. Roy, 119 (R.C.A.F.) Sqn.; W/O. Cl. I J. Billings, 10 (R.C.A.F.) Sqn.; W/O. Cl. I W. C. Maxwell, 10 (R.C.A.F.) Sqn.

Air Force Cross

Grp. Capt. J. G. Stephenson, R.C.A.F.; Grp. Capt. A. Watts, R.C.A.F.; Wing Cdr. W. J. Bundy, R.C.A.F.; Wing Cdr. H. H. Langford, R.C.A.F.; Wing Cdr. J. C. Mirabelli, R.C.A.F.; Wing Cdr. E. M. Revno, R.C.A.F.; Wing Cdr. W. R. D. Turner, R.C.A.F.; Wing Cdr. F. B. H. Hayward, R.A.F.; Sqn. Ldr. H. C. Jewsbury, R.C.A.F.

Sqn. Ldr. A. R. Morrissette, R.C.A.F.; Flt. Lt. J. A. Boyle, R.C.A.F.; Flt. Lt. G. Davison, R.A.F.; Flt. Lt. W. H. Durnin, R.C.A.F.; Flt. Lt. H. F. Featherby, R.A.F.V.R.; Flt. Lt. F. D. McKechnie, R.C.A.F.; F/O. R. J. E. Barichelle, R.C.A.F.; F/O F. V. Pilon, R.C.A.F.; P/O. C. G. R. Dyer, R.C.A.F.; W/O. Cl. I W. D. Bailey, R.C.A.F.; W/O. J. A. Harrison, R.A.F.V.R.

Air Force Medal

L.A/C. J. D. Collins, R.A.F.V.R.

UNION OF SOUTH AFRICA

O.B.E. (Military Division)

Col. B. G. Viljoen, S.A.A.F.

M.B.E. (Military Division)

Lt. Col. H. Woodward, S.A.A.F.; Maj. H. Starfield, S.A.A.F.; Maj. F. C. J. Fry, S.A.A.F.; Maj. S. Biesheuvel, S.A.A.F.; Capt. E. E. Schmidt, S.A.A.F.; Lt. Olive R. (Mrs.) Scholtz, W.A.A.F.

Bar to the Air Force Cross

Maj. M. J. Uys, S.A.A.F.

Air Force Cross

Lt. Col. E. A. Pope; Maj. P. J. Hayden-Thomas; Maj. R. C. Davidson; Capt. G. C. H. Freeman; Capt. W. M. Smith; Capt. H. P. Blinkhorn; Lt. D. P. Du Toit; Lt. C. F. R. Le Sueur; Lt. H. J. R. Tindall; W/O. Cl. II J. R. Lund, all S.A.A.F.

ORDER OF THE BRITISH EMPIRE

O.B.E. (Civil Division)

J. M. Dodds, Head of Research Dept., Metropolitan Vickers Electrical Co., Ltd.; W. A. Duncan, Deputy Dir. of Signals, Air Ministry; C. E. Fielding, Dir., A. V. Roe and Co., Ltd.; W. Gairns, Deputy Dir. of Accounts, M.A.P.; Capt. J. C. Harrington, Senr. Capt. B.O.A.C.; Wing Cdr. J. K. R. Howard, R.A.F.V.R., Civil Asst., Air Ministry; F. P. Laurens, Works Supt., Vickers-Armstrongs, Ltd.; G. S. C. Lucas, Head of Electrical Development Section, British Thomson-Houston Co., Ltd.; Capt. D. M. McVicar, Capt. of Aircraft, N. Atlantic Service; R. M. Poulter, Sen. Meteorological Officer, Grp. H.Q., R.A.F.; A. G. Pugsley, D.Sc., Supt., R. Aircraft Establishment.

M.B.E. (Civil Division)

Flt. Lt. C. Boxhall, Education Officer, R.A.F. Educational Service; B. G. Brame, Asst. Meteorological Office, Air Ministry; Capt. H. S. Broad, Ch. Production Test Pilot, Hawker Aircraft, Ltd.; C. H. Cunniffe, Manager, Baldwins, Ltd.; W. T. Elson, Asst. Production Manager, Gloster Aircraft Co., Ltd., Sqn. Ldr. J. D. Haddon, Education Officer, R.A.F. Educational Service, Tech. Training Command; Flt. Capt. J. S. Halliday, Air Transport Auxiliary; W. G. Harding, Gyroscopical Engineer, the Sperry Gyroscope Co.; A. Henshaw, Ch. Test Pilot, Vickers-Armstrongs, Ltd.; F. J. V. Holmes, Works Manager, Airports, Ltd.; J. J. Hutchinson, Asst. Manager, Vickers-Armstrongs, Ltd; Observer Cdr. C. A. Lakin, Grp. Commandant, R. Observer Corps.; Observer Cdr. J. O. A. F. Mackenzie, Grp. Commandant, R. Observer Corps.; Mrs. M. B. O'Callaghan, Voluntary Welfare Worker, R.A.F. Hospital, Ely; H. H. Tozer, Sen. Supt., Saunders-Roe, Ltd.; A. Venner, Sen. Tech. Officer, M.A.P.; J. Weedy, Works Manager, de Havilland Aircraft Co., Ltd.; S. P. Woodley, Resident Manager, Vickers-Armstrongs, Ltd.

IMPERIAL SERVICE ORDER

Companions of the Order

Home Civil Service

C. V. Burlton, Principal, Air Ministry.

Commended for Valuable Service in the Air

Capt. W. Armstrong, B.O.A.C.; J. R. Fraser, Radio Officer, No. 45 Atlantic Transport Grp., R.A.F.; J. E. Giles, Radio Officer, B.O.A.C.; Capt. C. B. Houlder, B.O.A.C.; Capt. A. C. Lorraine, B.O.A.C.; A. M. Loughridge, Radio Officer, No. 45 Transatlantic Grp., R.A.F.; Capt. W. F. S. Luck, No. 45 Atlantic Transport Grp., R.A.F.; J. D. McIntyre, Radio Officer, No 45 Atlantic Transport Grp., R.A.F.; Capt J. T. Percy, B.O.A.C.; Capt. F. D. Travers, B.O.A.C.; Capt. R. I. B. Winn, B.O.A.C

CIVILIAN ADVISER ON BRIDGE BLITZ

DURING the last few months a mild-looking man in a navy blue suit has been wandering through the corridors of the country mansion which is the headquarters of the A.E.A.F. He is a railway expert, normally engaged on research, who has been loaned to the A.E.A.F. to advise on the great Continental rail attack.

This man with the friendly smile and pleasant voice attends meetings of the Senior Air Officers who direct the transport attacks. Seated at the conference table in the midst of high-ranking, beribboned officers, he looks rather out of place. But these officers listen with respect to his opinion. When he points to the map and says: "If you put your bombs there, I think it will hurt most," his judgment carries weight, for he has a perfect knowledge of the rail system of the Continent. His advice has already been of inestimable value in the preparation and execution of these attacks on communications.

The plan aimed at severing the arteries through which German supplies and reserves flow. Not only has the railway system of Northern and South-western France become chaotic, but the destruction of river bridges has isolated whole areas. The importance of rail communications in wartime is difficult to over-estimate, and the Germans have shown themselves adept in the use of the railways for offensive operations.

Bridges, railway centres and junctions have been wrecked in the last two months.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

TECHNICAL TRAINING

Post-war Use for R.A.F. Varsity Course

MIGHT I suggest that, after the war, the R.A.F.'s University Entrance Scheme (or preferably a civil version) be retained. This six months' course is very popular, and if something like it was available after the war it would do much to help along aviation and could perhaps be combined with desirable general education. A full university education is never likely to be available to many people, but many of its advantages can be had from courses such as the R.A.F. started.

It could be called, say, the "Empire University Air Scheme," and all universities could have a group affiliated to them. Subjects such as the principles of flight, navigation, meteorology, wireless, elementary aeronautical engineering, administration, etc., could be available according to the individual requirements of the student. In the main, however, no attempt would be made to specialise in such a course.

A knowledge of these subjects would be invaluable to prospective pilots, air crews, engineers, designers, control executives, and, indeed, anyone who was making a career in aviation.

Previously it has been emphasised that in many cases in aviation there was too much specialisation. Such a course would do much to prevent this and better co-ordination would be the result.

Perhaps readers have something to say on the subject?

J. H.

THE "MAIL" PLANE

Negative Oil Pressure

WE are deeply moved by "ZQ's" criticism of the Correspondence Mail Plane. Who does he think *he* is? Coming along with his castor oil and inverted bottles and stiff axles and things, and saying he's a medical student and ZQ and all the rest! Seems like a fellow can't even design a helicopter these days without some busy medical type busting in and saying he can foresee difficulties and suggesting inverted bottles of castor oil—nice old waste of oil that would be! All very well in a surgery no doubt, but there's no end of a difference between a surgery and a rotor head—especially when it comes to vertical descent and ground effect.

As a matter of fact, the rotor head of the Correspondence Mail Plane is lubricated by a very ingenious system. The oil is not *pushed* around its course, but *sucked* so that the actual pressure in the system is below that of the surrounding atmosphere. By this method no oil can ever escape from the system and, in addition, the oil is automatically cooled by the air which is continually rushing into the system at all the points of leakage.

BRADBURY.

THE FAIREY BARRACUDA

First Deck Landings

I WOULD be grateful if you would allow me to make a correction to a statement in *Flight*, April 20th, 1944, on the subject of the Barracuda. I mentioned in that article that Lt. Cdr. Torrens-Spence, D.S.O., D.S.C., R.N., made the first deck landings with the Barracuda; but in fact these were made by Lt. Cdr. James Tillard on May 18th, 1941. The original landings were made in the prototype which went back to the constructors for alterations, including the major alteration of stepping up the tail. It was with the "tail-up". Barracuda that the first production type Barracuda landings were made on September 25th, 1942, by Lt. Cdr. Torrens-Spence.

B. J. HURREN.

JET PROPULSION FOR AIRCRAFT

Operation in Heavy Rain

ONE point about this method of propelling aircraft has intrigued me for some time past, namely, the effect on the plant when operating in heavy rain. Owing to the large volume of air consumed, does the amount of water it contains in the form of rain have a cooling effect great enough to decrease expansion and thus ejection velocity, or is sufficient heat generated to absorb the water as steam without loss of expansion?

Also, if steam is present in the system, does it improve the efficiency of the turbine by producing a denser gas, or does the increased load of the air compressor decrease r.p.m.?

Maybe there are some readers who can shed a little light upon this aspect of the jet plant, if they will oblige.

K. V. P.

LOCKHEED LIGHTNING *(Continued from page 670)*

In the centre-section of the wing a forward spar of simple I-beam construction is fitted, along the front face of which are carried numerous pipe lines for engine instruments, electrical services, etc.

As may be seen from the cut-away drawing, the wing surfaces, top and bottom, are carried on transverse corrugated sheets, to the crowns of which the skin is riveted. These corrugations extend to the aileron on the lower wing surface, but about three feet, in diminishing lengths, on the upper surface. The corrugations are attached to built-up ribs running between the spars, but where the corrugations finish the outer panels are of pressed sheet ribs, with vertical dimpling for rigidity, over which run stringers to which the skin is riveted. A similar construction obtains behind the rear spar inboard of the ailerons. The leading edges of the outer panels are made up of single-piece corrugated pressed sheet, the skin being stretched over the corrugations but not riveted to them. The leading edge skin is in upper and lower halves joined along their length at the leading-edge line by a piano-wire hinge; a length of fabric is then doped over the joint. The interior of the leading-edge is wholly occupied by a self-sealing fuel tank in each outer wing panel.

The ailerons are of normal rib, stringer and skin construction, but the method of attachment to the wing is most unusual. The hinge is a continuous piano-wire type along the length of the top leading-edge, and an extension fairing piece on the bottom leading-edge allows full and efficient shrouding throughout the full aileron travel.

The fuel system on the P.38 is well conceived, and consists of port and starboard main tanks housed between the main and rear spars in the centre section; port and starboard reserve tanks forward of the main spar in the centre section; the wing leading-edge tanks; a surge tank in the fuselage behind the main spar into which the main and reserve tanks feed for distribution to each engine; and, lastly, the optional use of drop tanks carried on streamlined shackles beneath the centre section, between fuselage and booms. Electrical booster pumps are housed beneath the surge tank and are cut-in for take-off and high-altitude operation, but normally fuel is delivered by engine-driven pumps. The leading-edge tanks have their own booster pumps, as their fuel is fed direct to the engines without first passing through the surge tank.

From the pilot's view the Lightning is a pretty good aircraft. Take-off and landing are incredibly smooth due to the combination of handed airscrews and tricycle landing gear, whilst the flap effect for landing is balanced and not at all uneven.

C. B. B.-W.

"H" HOUR HEROES: Halifaxes, Horsas and Hamilcars on an airfield prior to "D" Day. Note the four-bladed airscrews on the Halifaxes. The tugs and gliders take off in pairs. As one pair takes off so the next two tugs taxi on to the runway, hitch up and then take off.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Promotions

GENERAL DUTIES BRANCH.

Air Comdre. (temp.) (Act. Air Vice-Marshal) C. R. STEELE, C.B., D.F.C., is granted the rank of Air Commodore (war subs.) May 1st, 1944.

Air Comdre. S. C. STRAFFORD, C.B.E., D.F.C., is granted the rank of Act. Air Vice-Marshal. May 15th, 1944.

ACCOUNTANT BRANCH.

Group Capt. (temp. Air Comdre.) J. RYLANDS, C.B.E., to be Air Comdre. May 19th 1944.

Awards

THE KING has been graciously pleased to approve the undermentioned awards in recognition of gallantry displayed in the following circumstances:—

One night in May, 1944, several crews of Mosquito aircraft were detailed for a difficult and dangerous mine-laying mission. The operation called for the highest standard of skill and accuracy. In the face of intense anti-aircraft fire, balloon defences and considerable searchlight activity the attack was pressed home with great precision from low level. That complete success was achieved in spite of such hazards is a high tribute to the calm courage and iron determination shown by the following officers who participated in various capacities as leaders and members of aircraft crew.

Distinguished Service Order

Act. Wing Cdr. S. D. WATTS, D.F.C., R.N.Z.A.F. No. 692 Sqn.

Act. Sqn. Ldr. E. J. SAUNDERSON, R.A.F.V.R., No. 692 Sqn.

Bar to Distinguished Flying Cross

F/O. C. HASSALL, D.F.C., R.A.F.V.R., No. 692 Sqn.

Distinguished Flying Cross

Act. Sqn. Ldr. G. MCKEAND, R.A.F.V.R., No. 692 Sqn.

Flt. Lt. J. H. BARRON, R.C.A.F., No. 692 Sqn.

Flt. Lt. J. P. FARROW, D.F.M. R.N.Z.A.F., No. 692 Sqn.

Flt. Lt. D. N. GRAINGER, D.F.M., R.A.F.V.R., No. 692 Sqn.

F/O. S. AINSWORTH, R.A.F.V.R., No. 692 Sqn.

F/O. E. B CHATFIELD, R.A.F.V.R., No. 692 Sqn.

Flt. Lt. D. N. RILEY, R.A.F.V.R., No. 692 Sqn.

F/O. V. P. B. HILL, R.C.A.F., No. 692 Sqn.

F/O J. PAGE, R.A.F.V.R., No. 692 Sqn.

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy:—

Distinguished Service Order

P/O. R. R. REED, R.A.F.V.R., No. 576 Sqn.—One night in May, 1944, this officer piloted an aircraft to attack a target in Southern France.

Sqn. Ldr. D. Miller, D.F.C., who has been awarded the D.S.O. The citation appears on the next page.

When nearing the objective the aircraft was attacked by a fighter. The intercommunication system was put out of action, but, although unable to receive any evading directions, P/O. Reed manœuvred with much skill. His aircraft, which had caught fire to the rear of the fuselage, had sustained extensive damage and went into a steep dive. With the greatest difficulty P/O. Reed succeeded in gaining control. The fire had subsided, but the mid-upper and rear turrets were out of action, leaving the aircraft defenceless. Nevertheless, P/O. Reed was determined to bomb the allotted target and went on to make a successful attack. Shortly afterwards another fighter attacked and further damage was sustained. Once more the aircraft was set on fire by the enemy's bullets, but the flames were extinguished by the flight engineer. The situation was by now most critical. The elevator and rudder trimmers were useless, the control surfaces had sustained damage, the hydraulic system was unserviceable, whilst the rear turret had been almost severed and was hanging loosely below the fuselage. To keep the aircraft level it was necessary for two members of the crew to help with the control column and the rudder control. Despite this, P/O. Reed kept to his homeward course and finally reached base, where he landed the crippled aircraft on one wheel. He displayed superb skill, unbeatable courage and determination, and his leadership in the face of hazardous circumstances proved most inspiring.

Act. Wing Cdr. C. G. RUTTAN, R.C.A.F., No. 415 (R.C.A.F.) Sqn.—Wing Cdr. Ruttan has been in charge of his squadron since April, 1943. During that period he has flown on operational sorties on every possible occasion, and has always been the first pilot of the squadron to try new methods of attack. By his untiring efforts and splendid leadership he has been largely responsible for the fine operational efficiency of the squadron he commands.

Act. Sqn. Ldr. J. M. MILBURN, R.A.F., No. 58 Sqn.—This officer has completed two tours of operations. He has taken part in many attacks on shipping and in numerous bombing missions. Throughout, he has set a high standard of gallantry and devotion to duty. On one occasion Sqn. Ldr. Milburn piloted an aircraft which attacked a medium-sized merchant vessel escorted by two armed ships. In spite of intense anti-aircraft fire, he pressed home his attack, and obtained a hit which badly disabled the merchantman. A further hit was then obtained by another aircraft of the squadron, and the vessel was set

SERVICE AVIATION

on fire. On his last sortie, an attack on shipping, Sqn. Ldr. Milburn's aircraft was severely damaged by anti-aircraft fire. Despite this, he pressed home his attack from an extremely low level. On the homeward flight Sqn. Ldr. Milburn was forced to bring his aircraft down on to the sea. He accomplished the task successfully and without injury to any of the crew, who were able to board the dinghy, which they paddled safely to the shore. Sqn. Ldr. Milburn has displayed inspiring leadership, great skill, and fine fighting qualities.

Act. Sqn. Ldr. D. MILLER, D.F.C., R.N.Z.A.F., No. 49 Sqn.—Since being awarded the D.F.C., this officer has completed very many sorties, including five attacks on Berlin and three against Hanover. Throughout he has displayed a high degree of skill, courage and resolution, qualities which have earned him much success. In April, 1944, he piloted an aircraft detailed for a mine-laying mission. In spite of opposing fire from armed ships and from the shore batteries, Sqn. Ldr. Miller executed his task with great precision, and afterwards completed the long flight home safely. His example has been worthy of emulation.

Act. Wing Cdr. A. S. JOHNSON, D.F.M., R.A.F., No. 83 Sqn.—This officer has completed a very large number of sorties, including attacks on most of the enemy's strongly defended targets in Germany. He has proved himself to be a skilful and courageous captain, whose determination to attack his targets with accuracy has been a prominent feature throughout his long tour. He is a most inspiring leader and his achievements have been worthy of the greatest praise.

Act. Sqn. Ldr. R. D. CAMPLING, D.F.C., R.A.F., No. 7 Sqn.—This officer has completed numerous sorties since being awarded the D.F.C., involving attacks on such targets as Berlin, Leipzig, Brunswick and Stettin. He is an outstanding pilot and captain whose gallant leadership and sterling qualities have been reflected in the fine fighting qualities of his crews. His successes pay an excellent tribute to his determination to bomb his targets with accuracy.

Act. Sqn. Ldr. D. A. DUNLOP, D.F.C., R.A.F.V.R., No. 7 Sqn.—Since being awarded the D.F.C., this officer has participated in numerous sorties, including four attacks on Berlin and three on Stuttgart. He is a fearless and efficient captain, whose example in the face of the fiercest opposition has been worthy of the highest praise. He has rendered loyal and devoted service.

Bar to Distinguished Flying Cross

Act. Sqn. Ldr. J. P. GEOGHEGAN, D.F.C., R.A.F.V.R., No. 156 Sqn.—This officer has participated in many sorties against heavily defended objectives in Germany and occupied territory. At all times his high sense of devotion to duty has been most commendable.

Act. Sqn. Ldr. J. R. WOOD, D.F.C., R.A.F., No. 35 Sqn.—As captain of aircraft Sqn. Ldr. Wood has completed a large number of operational sorties. He has invariably pressed home his attacks regardless of enemy opposition, displaying courage and great devotion to duty.

Act. Flt. Lt. M. R. CHICK, D.F.C., R.A.F., No. 83 Sqn.—Since the award of the D.F.C., this officer has continued to take part in operational sorties with outstanding distinction and brilliance. He has frequently made three bombing runs over the target in the face of intense anti-aircraft fire, to ensure complete accuracy. Flt. Lt. Chick has attacked most of the heavily defended industrial centres in Germany with great determination and skill.

Act. Flt. Lt. L. W. OVERTON, D.F.C., R.A.F., No. 156 Sqn.—A distinguished pilot and efficient captain of aircraft, Flt. Lt. Overton has attacked the majority of the most heavily defended targets in Germany, including seven sorties to Berlin. In spite of intense opposition he has consistently pressed home his attacks, displaying outstanding courage and a high sense of duty.

Act. Flt. Lt. J. L. SLOPER, D.F.C., R.A.F.V.R., No. 156 Sqn.—On every occasion Flt. Lt. Sloper has proved himself to be an efficient and capable captain of aircraft. His unfailing enthusiasm for operational flying, and his willingness to help and advise new members of aircraft crew have made him a valuable asset to his squadron.

Act. Flt. Lt. M. B. WHITBREAD, D.F.C., R.A.F.V.R., No. 7 Sqn.—An outstanding navigator, this officer has played no small part in the many successes achieved by his crew. His accuracy and attention to detail have been of the highest order and he has displayed commendable coolness and courage under fire. Flt. Lt. Whitbread has done much to maintain the high standard of navigation attained by his squadron.

Act. Wing Cdr. F. A. ARTHUR, D.F.C., R.A.A.F., No. 460 (R.A.A.F.) Sqn.—Wing Cdr. Arthur has completed two tours of operational duty, and since being awarded the D.F.C., has participated in attacks on some of the most important and strongly defended targets in Germany. A first-class navigator and squadron commander, he has consistently displayed a fine fighting spirit, great courage and devotion to duty, undertaking each sortie with enthusiasm and determination.

Distinguished Flying Cross

Flt. Lt. E. V. SMITH, R.A.F.V.R., No. 109 Sqn.
Flt. Lt. R. A. STRACHAN, R.A.F.V.R., No. 105 Sqn.
Act. Flt. Lt. K. N. GIBSON, R.A.F.V.R., No. 49 Sqn.
Act. Flt. Lt. L. LINTOTT, R.A.F.V.R., No. 97 sqn.
Act. Flt. Lt. A. W. LISTER, R.A.F.V.R., No. 35 Sqn.
Act. Flt. Lt. H. J. SMITH, R.A.F., No. 7 Sqn.

PROMOTED : An intruder Mosquito of A.E.A.F. having its three white and two black stripes painted on the wings and fuselage.

Act. Flt. Lt. J. K. STEWART, R.A.F.V.R., No. 35 Sqn.
F/O. P. E. CADMAN, R.A.F.V.R., No. 105 Sqn.
F/O. J. HALL, R.A.F.V.R., No. 105 Sqn.
F/O. H. JOHNSON, R.A.F.V.R., No. 106 Sqn.
F/O. F. L. LAKE, R.A.F.V.R., No. 12 Sqn.
F/O. L. E. TAYLOR, R.A.F.V.R., No. 49 Sqn.
P/O. R. T. CADMAN, R.A.F.V.R., No. 101 Sqn.
P/O. O. W. CATT, R.A.F.V.R., No. 7 Sqn.
P/O. D. W. INCE, R.A.F.V.R., No. 101 Sqn.
W/O. J. W GIBB, R.A.F.V.R.
W/O. L. J. NORTH, R.A.F.V.R., No. 35 Sqn.
Act. W/O. B. C. BROOKER, R.A.F.V.R., No. 35 Sqn.
Act. W/O. A. J. IRWIN, R.A.F.V.R., No. 156 Sqn.
Act. W/O. W. OATES, R.A.F.V.R., No. 83 Sqn.
Flt. Lt. R. B. SMITH, R.A.A.F., No. 105 Sqn.
Act. Flt. Lt. W. S. WALKER, R.A.A.F., No. 156 Sqn.
Act. Flt. Lt. R. G. WOOD, R.A.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. B. R. JONES, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
P/O. A. G. J. CHADWICK-BATES, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
P/O. R. E. WELLHAM, R.A.A.F., No. 626 Sqn.
Act. Flt. Lt. J. A. F. SIMPSON, R.C.A.F., No. 109 Sqn.
Act. Flt. Lt. C. R. SNELL, R.C.A.F., No. 97 Sqn.
F/O. G. G. MACLEOD, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
P/O. I. G. MCEWAN, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
W/O. M. A. ARNOTT, R.C.A.F., No. 35 Sqn.
W/O. H. R. HURST, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
P/O. E. L. ANDERSON, R.A.F.V.R., No. 76 Sqn.
P/O. D. R. FORSYTH, R.A.A.F., No. 76 Sqn.
W/O. J. W. G. EATON, R.A.F., No. 105 Sqn.
P/O. A. W. MOORE, R.A.F.V.R., No. 12 Sqn.
Sqn. Ldr. M. R. ATTWATER, R.A.F.V.R., No. 576 Sqn.
Sqn. Ldr. E. F. CAWDERY, R.A.F.O., No. 97 Sqn.
Flt. Lt. G. R. GLOVER, R.A.F.V.R., No. 10 Sqn.
F/O. D. C. ARMSTRONG, R.A.F.V.R., No. 44 Sqn.
F/O. A. J. L. HICKOX, R.A.F.V.R., No. 627 Sqn.
F/O. R. E. KNIGHTS, R.A.F.V.R., No. 619 Sqn.
F/O. A. G. WILLS, R.A.F.V.R., No. 192 Sqn.
P/O. A. BEALE, R.A.F.V.R., No 50 Sqn.
P/O. J. N. MATHER, R.A.F.V.R., No. 625 Sqn.
P/O. A. H. PEARCE, R.A.F.V.R., No. 625 Sqn.
P/O. W. C. B. SMITH, R.A.F.V.R., No. 50 Sqn.
P/O. H. THOMAS, R.A.F.V.R., No. 207 Sqn.
W/O. W. PARKER, R.A.F.V.R., No. 97 Sqn.
F/O. K. W. GALE, R.A.A.F., No. 627 Sqn.
P/O. C. W. LANHAM, R.A.A.F., No. 626 Sqn.
F/O. J. E. AGROIS, R.C.A.F., No. 424 R.C.A.F.) Sqn.
F/O. A. C. GROUT, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
P/O. W. DINGLEY, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
P/O. S. A. MEEKS, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
W/O. P. M. CONNOR, R.C.A.F., No. 83 Sqn.
W/O. W. T. EVANS, R.C.A.F., No. 138 Sqn.
W/O. W. PATERSON, R.C.A.F., No. 460 (R.A.A.F.) Sqn.
W/O. G. A. WILKIE, R.C.A.F., No. 44 Sqn.
F/O. J. M. MEE, R.N.Z.A.F., No. 7 Sqn.
P/O. J. C. ALLAN, R.N.Z.A.F., No. 218 Sqn.
Act. Flt. Lt. J. S. LUDFORD, R.A.F., No. 57 Sqn.
F/O. B. C. ROBERTS, R.A.F.V.R., No. 248 Sqn.
F/O. F. A. THOMAS, R.A.F.V.R., No. 57 Sqn.
F/O. G. N. E. YEATES, R.A.F.V.R., No. 248 Sqn.
Act. Flt. Lt. J. F. W. ADAMS, R.A.F.V.R., No. 49 Sqn.
F/O. R. F. ANDERSON, R.A.A.F., No. 106 Sqn.
F/O. J. B. LATHAM, R.A.F.V.R., No. 106 Sqn.
P/O. R. L. CUTLER, R.A.F.V.R., No. 199 Sqn.
P/O. G. S. MILNE, R.C.A.F., No. 106 Sqn.
P/O. A. W SHINN, R.A.F.V.R. No. 49 Sqn.
Wing Cdr. R. S. TURNBULL, A.F.C., D.F.M., R.C.A.F. Sqn.
Act. Wing Cdr. D. T. FRENCH, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Act. Wing Cdr. W. PLEASANCE, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. H. R. F. DYER, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. W. A. RUSSELL, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
Act. Wing Cdr. C. E. HARRIS, R.A.F.O., No. 434 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. S. L. SMART, R.A.F.V.R., No. 149 Sqn.
Flt. Lt. T. G. CORNER, R.A.F.V.R., No. 161 Sqn.
Flt. Lt. G. J. CRIBB, R.A.F.V.R., No. 427 (R.C.A.F.) Sqn.
Flt. Lt. K. A. MAJOR, R.A.F., No. 100 Sqn.
Flt. Lt. K. A. SANDISON, R.A.F.V.R., No. 619 Sqn.
Flt. Lt. H. STILES, R.A.F.V.R., No. 138 Sqn.
Act. Flt. Lt. J. BROWN, R.A.F.V.R., No. 426 (R.C.A.F.) Sqn.
Act. Flt. Lt. C. E. T. CHETHAM, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Lt. J. DODDS, R.A.F.V.R., No. 76 Sqn.
Act. Flt. Lt. W. R. FRANCIS, R.A.F.V.R., No. 50 Sqn.
Act. Flt. Lt. D. F. GILSON, R.A.F.V.R., No. 75 (N.Z.) Sqn.
Act. Flt. Lt. R. D. KIRKWOOD, R.A.F.V.R., No. 76 Sqn.
Act. Flt. Lt. J. B. MORRIS, R.A.F.V.R., No. 51 Sqn.
Act. Flt Lt. S. W. J. UPCHURCH, R.A.F.V.R., No. 149 Sqn.
F/O. K. W. ARMSTRONG, R.A.F.V.R., No. 514 Sqn.
F/O. A. V. J. BARBER, R.A.F.V.R., No. 192 Sqn.
F/O. R. R. BIRCHALL, R.A.F.V.R., No. 115 Sqn.
F/O. H. C. BOYD, R.A.F.V.R., No. 109 Sqn.
F/O. H. H. CHADWICK, R.A.F.V.R., No. 57 Sqn.
F/O. D. A. COLOMBO, R.A.F.V.R., No. 12 Sqn.
F/O. W. L. COOK, R.A.F.V.R., No. 102 Sqn.
F/O. S. R. GRAFTON, R.A.F.V.R., No. 90 Sqn.
F/O. E. MCP. GRAHAM, R.A.F.V.R., No. 576 Sqn.
F/O. C. HASSALL, R.A.F.V.R., No. 692 Sqn.
F/O. G. K. KING, R.A.F.V.R., No. 57 Sqn.
F/O. A. C. E. LANCE, R.A.F.V.R., No. 619 Sqn.
F/O. T. MCNICHOLAS, R.A.F., No. 7 Sqn.
F/O. W. MORTON, R.A.F.V.R., No. 578 Sqn.
P/O. J. A. BARTHOLOMEW (since deceased), R.A.F., No. 97 Sqn.
P/O. T. L. BUCHANAN, R.A.F.V.R., No. 161 Sqn.
P/O. V. J. W. FRYER, R.A.F.V.R., No. 578 Sqn.
P/O. I. F. GRAY, R.A.F.V.R., No. 101 Sqn.
P/O. D. W. HEARSEY, R.A.F.V.R., No. 578 Sqn.
P/O. C. R. IZZARD, R.A.F.V.R., No. 578 Sqn.
P/O. P. V. JONES, R.A.F.V.R., No. 103 Sqn.
P/O. R. LEVY, R.A.F.V.R., No. 578 Sqn.
P/O. R. J. H. LITTLETON, R.A.F.V.R., No. 166 Sqn.
P/O. L. S. MASON, R.A.F.V.R., No. 90 Sqn.
P/O. J. MCGREGOR, R.A.F.V.R., No. 51 Sqn.
P/O. D. T. MEAD, R.A.F.V.R., No .100 Sqn.
P/O. K. W. MORGAN, R.A.F.V.R., No. 75 (N.Z.) Sqn.
P/O. L. C. POLL, R.A.F.V.R., No. 105 Sqn.
P/O. W. G. RADCLIFFE, R.A.F., No. 617 Sqn.
P/O. S. V. SAFFELLE, R.A.F.V.R., No. 207 Sqn.
P/O. J. SHERIFF, R.A.F.V.R., No. 57 Sqn.
P/O. D. P. STOREY, R.A.F.V.R., No. 51 Sqn.
P/O. A. N. W. WATSON, R.A.F.V.R., No. 90 Sqn.
P/O. D. A. WEST, R.A.F.V.R., No. 57 Sqn.
P/O. J. E. WHITLOCK, R.A.F., No. 100 Sqn.
W/O. W. J. BENNETT, R.A.F.V.R., No. 617 Sqn.
W/O E. R. LANCASTER, R.A.F.V.R., No. 12 Sqn.
W/O. E. A. MORRELL, R.A.F., No. 76 Sqn.
Act. W/O. P. J ALDRIDGE, R.A.F.V.R., No. 7 Sqn.
Act. Wing Cdr. H. D. MARSH, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Act. Sqn. Ldr. W. W. M. DEBOOS, R.A.A.F., No. 7 Sqn.
Flt Lt. D. C. DIXON R.A.A.F., No. 105 Sqn
F/O. A. E. KELL, R.A.A.F., No. 463 (R.A.A.F.) Sqn.

SERVICE AVIATION

F/O. R. M. STANFORD, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
P/O. F. LANGFORD, R.A.A.F., No. 90 Sqn.
P/O. E. C. PRIEST, R.A.A.F., No. 578 Sqn.
W/O. Q. SNOW, R.A.A.F., No. 44 Sqn.
W/O. G. S. TEITZ, R.A.A.F., No. 101 Sqn.
Flt. Lt. W. J. HARRIS, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
Act. Flt. Lt. J. R. HANSON, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
Act. Flt. Lt. F. N. MURRAY, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
Act. Flt. Lt. L. J. TOMS, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
F/O. J. K. GOURLAY, R.C.A.F., No. 44 Sqn.
F/O. J. H. PRATT, R.C.A.F., No. 630 Sqn.
F/O. A. P. SMITH, R.C.A.F., No. 429 Sqn.
P/O. S. DAVIDSON, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
P/O. W. R. S. NOYES, R.C.A.F., No. 199 Sqn.
P/O. J. E. POWERS, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. J. A. NEILSON, R.N.Z.A.F., No. 626 Sqn.
Act. Flt. Lt. C. S. GAY, R.N.Z.A.F., No. 90 Sqn.
Act. Flt. Lt. J. D. GRUBB, R.N.Z.A.F., No. 75 (N.Z.) Sqn.
Act. Sqn. Ldr. F. R. BIRD, R.A.F., No. 105 Sqn.
Act. Sqn. Ldr. R. B. ROACHE, R.A.F.V.R., No. 35 Sqn.
Act. Sqn. Ldr. J. G. WOOLLATT, R.A.F.V.R., No. 12 Sqn.
Flt. Lt. J. B. BURT, R.A.F.V.R., No. 109 Sqn.
Flt. Lt. G. H. GILBERT, R.A.F.V.R., No. 105 Sqn.
Flt. Lt. C. V. PEREIRA, R.A.F.V.R., No. 105 Sqn.
Flt. Lt. W. G. WESLEY, R.A.F.V.R., No. 83 Sqn.
Flt. Lt. J. E. R. WILLIAMS, R.A.F.V.R., No. 61 Sqn.
Act. Flt. Lt. V. W. ARMITAGE, R.A.F.V.R., No. 102 Sqn.
Act. Flt. Lt. E. N. ARMSTRONG, R.A.F.V.R., No. 9 Sqn.
Act. Flt. Lt. R. FERGUSON, D.F.M., R.A.F., No. 7 Sqn.
Act. Flt. Lt. R. HARTLEY, R.A.F.V.R., No. 109 Sqn.
Act. Flt. Lt. T. L. HILDREW, R.A.F.V.R., No. 105 Sqn.
Act. Flt. Lt. L. V. HYDE, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Lt. L. C. JONES, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Lt. R. R. LEEDER, R.A.F.V.R., No. 101 Sqn.
Act. Flt. Lt. R. B. LEIGH, R.A.F.V.R., No. 156 Sqn.
Act. Flt. Lt. E. H. PALMER, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Lt. G. D. PERKS, R.A.F.V.R., No. 434 Sqn.
Act. Flt. Lt. D. H. PIDDING, R.A.F.V.R., No. 83 Sqn.
Act. Flt. Lt. A. F. POORE, R.A.F.V.R., No. 106 Sqn.
Act. Flt. Lt. J. SIMMS, R.A.F.V.R., No. 57 Sqn.
Act. Flt. Lt. I. SIMPSON, R.A.F.V.R., No. 77 Sqn.
F/O. K. J. ANDERSON, R.A.F.V.R., No. 207 Sqn.
F/O. C. W. BARNETT, R.A.F.V.R., No. 207 Sqn.
F/O. A. G. BLOIS, R.A.F.V.R., No. 630 Sqn.
F/O. A. E. BRISTOW, R.A.F.V.R., No. 106 Sqn.
F/O. G. H. CRANSWICK, R.A.F.V.R., No. 76 Sqn.
F/O. R. DAVIS, R.A.F.V.R., No. 57 Sqn.
F/O. E. J. DENSLEY, R.A.F.V.R., No. 101 Sqn.
F/O. R. J. ELSEY, R.A.F.V.R., No. 106 Sqn.
F/O. P. B. HALL, R.A.F.V.R., No. 9 Sqn.
F/O. W. HALL, R.A.F.V.R., No. 77 Sqn.
F/O. P. M. J. HARRIS, R.A.F.V.R., No. 76 Sqn.
F/O. M. HOLLIDAY, R.A.F., No. 77 Sqn.
F/O. L. HORNER, R.A.F.V.R., No. 50 Sqn.
F/O. G. S. JOHNSON, R.A.F., No. 57 Sqn.
F/O. W. W. LEE, R.A.F., No. 7 Sqn.
F/O. A. J. MCCORMICK, R.A.F.V.R., No. 138 Sqn.
F/O. H. J. MAY, R.A.F.V.R., No. 9 Sqn.
F/O. R. A. ROBERTS, R.A.F.V.R., No. 106 Sqn.
F/O. C. SQUIRES, R.A.F.V.R., No. 166 Sqn.
F/O. G. R. D. TOOGOOD, R.A.F.V.R., No. 106 Sqn.
F/O. J. A. TURNER, R.A.F.V.R., No. 101 Sqn.
P/O. J. C. BELL, R.A.F.V.R., No. 106 Sqn.
P/O. D. W. J. BUTLER, R.A.F.V.R., No. 12 Sqn.
P/O. J. H. COLLINS, R.A.F.V.R., No. 57 Sqn.
P/O. T. DAVIES, R.A.F., No. 57 Sqn.
P/O. C. A. EDWARDS, R.A.F., No. 12 Sqn.
P/O. W. V. J. GOULD, R.A.F.V.R., No. 7 Sqn.
P/O. S. W. GREENWOOD, R.A.F.V.R., No. 9 Sqn.
P/O. G. A. INERARITY, R.A.F.V.R., No. 7 Sqn.
P/O. A. MCCARTNEY, R.A.F.V.R., No. 7 Sqn.
P/O. J. C. MCLEISH, R.A.F.V.R., No. 97 Sqn.
P/O. M. A. MANSER, R.A.F.V.R., No. 76 Sqn.
P/O. J. M. MARTIN, R.A.F.V.R., No. 57 Sqn.
P/O. C. K. MAUN, R.A.F.V.R., No. 101 Sqn.
P/O. P. R. MILTON, R.A.F.V.R., No. 12 Sqn.
P/O. R. A. NIGHTINGALE, R.A.F.V.R., No. 101 Sqn.
P/O. H. G. NIXON, R.A.F.V.R., No. 166 Sqn.
P/O. L. PARK, R.A.F.V.R., No. 100 Sqn.
P/O. P. F. ROBERTS, R.A.F.V.R., No. 44 Sqn.
P/O. J. L. RUMGAY, R.A.F.V.R., No. 207 Sqn.
P/O. T. SMART, R.A.F.V.R., No. 630 Sqn.
P/O. F. B. SOAPER, R.A.F.V.R., No. 44 Sqn.
P/O. V. SOUTHWELL, R.A.F.V.R., No. 426 (R.C.A.F.) Sqn.
P/O. R. H. SUTTON, R.A.F.V.R., No. 161 Sqn.
P/O. G. W. TEBBS, R.A.F.V.R., No. 625 Sqn.
P/O. J. E. TREBLE, R.A.F.V.R., No. 77 Sqn.
P/O. F. J. TREEN, R.A.F.V.R., No. 166 Sqn.
P/O. R. O. TUDBERRY, R.A.F.V.R., No. 35 Sqn.
P/O. H. T. TURNER, R.A.F.V.R., No. 12 Sqn.
P/O. E. H. WALKER, R.A.F.V.R., No. 61 Sqn.
P/O. L. S. WHITE, R.A.F.V.R., No. 35 Sqn.
W/O. J. G. HOEY, R.A.F., No. 83 Sqn.
Act. W/O. D. FLYNN, R.A.F.V.R., No. 156 Sqn.
Act. W/O. C. S. GOODMAN, R.A.F.V.R., No. 7 Sqn.
Act. W/O. N. KAYE, R.A.F.V.R., No. 7 Sqn.
Act. W/O. V. F. SALTER, R.A.F.V.R., No. 156 Sqn.
Act. W/O. C. M. H. WELSH, R.A.F.V.R., No. 7 Sqn.
Act. W/O. F. H. S. WHITE, R.A.F.V.R., No. 97 Sqn.
Flt. Lt. F. W BOYLE, R.A.A.F., No. 627 Sqn.
Flt. Lt. W. A. CHRISTENSEN, R.A.A.F., No. 105 Sqn.
Act. Flt. Lt. R. EASSON, R.A.A.F., No. 97 Sqn.
F/O. N. KNIGHT, R.A.A.F., No. 626 Sqn.
W/O. J. MCKEAN, R.A.A.F., No. 626 Sqn.
Act. W/O. K. A. JOLLEY, R.A.A.F., No. 97 Sqn.
Act. Flt. Lt. E. BAKER, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
Act. Flt. Lt. D. O. BLAMEY, R.C.A.F., No. 156 Sqn.
Act. Flt. Lt. R. BURNS, R.C.A.F., No. 408 (R.C.A.F.).
Act. Flt. Lt. J. M. MITCHELL, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
Act. Flt. Lt. R. E. D. RATCLIFFE, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Act. Flt. Lt. D. N. ROW, R.C.A.F., No. 7 Sqn.
Act. Flt. Lt. H. S. SHORTT, R.C.A.F., No. 50 Sqn.
F/O. S. W. ARMSTRONG, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. L. T. BERRIGAN, R.C.A.F., No. 7 Sqn.
F/O. I. N. PETERSON, R.C.A.F., No. 426 (R.C.A.F.) Sqn.

Conspicuous Gallantry Medal (Flying)

Sgt. E. D. DURRANS, R.A.F.V.R., No. 90 Sqn.—This airman was the wireless operator of an aircraft detailed for a sortie one night in April, 1944. On the return flight the aircraft was hit by anti-aircraft fire. Sgt. Durrans was severely wounded by flying fragments of shrapnel. Although suffering acutely and affected by the loss of blood, Sgt. Durrans would not leave his post and continued working his wireless apparatus until the aircraft reached the English coast. His courage, fortitude and utter disregard for his own welfare set an example in keeping with the best traditions of the Royal Air Force.

Distinguished Flying Medal

Flt. Sgt. T. P. BISHOP, R.A.F.V.R., No. 625 Sqn.
Flt. Sgt. J. BOADEN, R.A.F.V.R., No. 106 Sqn.
Flt. Sgt. C. W. DIMBLEBY, R.A.F.V.R., No. 44 Sqn.
Flt. Sgt. W. P. HAIG, R.A.F.V.R., No. 106 Sqn.
Flt. Sgt. P. J. MORLEY, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. N. D. OWEN, R.A.F., No 9 Sqn.
Flt. Sgt. B. H. WHITE, R.A.F.V.R., No. 44 Sqn.
Sgt. A. G. DENYER, R.A.F.V.R., No. 9 Sqn.
Sgt. S. E. EMMETT, R.A.F.V.R., No. 100 Sqn.
Sgt. A. FIELDING, R.A.F.V.R., No. 9 Sqn.
Sgt. D. B. GLENDINNING, R.A.F.V.R., No. 101 Sqn.
Sgt. F. R. GREIG, R.A.F.V.R., No. 101 Sqn.
Sgt. K. PACK, R.A.F.V.R., No. 9 Sqn.
Sgt. H. R. PITCHER, R.A.F.V.R., No. 44 Sqn.
Sgt. E. SISSONS, R.A.F.V.R., No. 12 Sqn.
Sgt. D. J. TAYLOR, R.A.F.V.R., No. 630 Sqn.
Flt. Sgt. D. B JAMES, R.A.F., No. 405 (R.C.A.F.) Sqn.
Flt. Sgt. R. H. MARTIN, R.A.F., No. 7 Sqn.
Flt. Sgt. W. R. MILL, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Flt. Sgt. P. A. MOORE, R.A.F.V.R., No. 460 (R.A.A.F.) Sqn.
Flt. Sgt. W. A. MOORE, R.A.F.V.R., No. 49 Sqn.
Flt. Sgt. T. D. J. MORGAN, R.A.F.V.R., No. 7 Sqn.
Flt. Sgt. J. MURPHY, R.A.F.V.R., No. 44 Sqn.
Flt. Sgt. E. R. OAKES, R.A.F.V.R., No. 9 Sqn.
Flt. Sgt. J. R. G. OSWICK, R.A.F.V.R., No. 44 Sqn.
Flt. Sgt. W. E. PATTISON, R.A.F., No. 78 Sqn.
Flt. Sgt. P. PULLAR, R.A.F.V.R., No. 207 Sqn.
Flt. Sgt. R. W. SILK, R.A.F.V.R., No. 83 Sqn.
Flt. Sgt. R. A. WARD, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. E. R. WRIGHT, R.A.F., No 405 (R.C.A.F.) Sqn.
Act. Flt. Sgt. W. A. MARRITT, R.A.F.V.R., No. 7 Sqn.
Sgt. J. BOYD, R.A.F.V.R., No. 83 Sqn.
Sgt. J. V. BRIGHAM, R.A.F.V.R., No. 214 Sqn.
Sgt. J. CHALONER, R.A.F.V.R., No. 49 Sqn.
Sgt. F. R. COX, R.A.F.V.R., No. 7 Sqn.
Sgt. J. H. FAWCETT, R.A.F.V.R., No. 76 Sqn.
Sgt. C. O. GIBBONS, R.A.F.V.R., No. 77 Sqn.
Sgt. D. C. HAMES, R.A.F.V.R., No. 626 Sqn.
Sgt. H. O. HINDERWELL, R.A.F.V.R., No. 100 Sqn.
Sgt. R. JEFFCOCK, R.A.F.V.R., No. 49 Sqn.
Sgt. C. G. KAVE, R.A.F.V.R., No. 101 Sqn.
Sgt. E. SULLIVAN, R.A.F.V.R., No. 9 Sqn.
Sgt. F. WADSWORTH, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. (now P/O.) J. H. THOMSON, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Flt. Sgt. W. KONDRA, R.C.A.F., No. 100 Sqn.
Flt Sgt. J. N. J. PILON, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
Flt. Sgt. E. ADAMSON, R.A.F.V.R., No. 101 Sqn.
Flt. Sgt. K. R. BLUNDELL, R.A.F.V.R., No. 44 Sqn.
Flt. Sgt. J. H. BRYANT, R.A.F.V.R., No. 619 Sqn.
Flt. Sgt. I. F. CARNEY, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. A. W. CASTLE, R.A.F.V.R., No. 625 Sqn.
Flt. Sgt. R. W. CLEARY, R.A.F.V.R., No. 57 Sqn.
Flt. Sgt. V. B. CROSBY, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. T. H. FRANKLIN, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. R. L. JONES, R.A.F.V.R., No. 7 Sqn.
Flt. Sgt. V. LYNCH, R.A.F.V.R., No. 106 Sqn.
Flt. Sgt. J. G. MYERSCOUGH, R.A.F., No. 207 Sqn.
Flt. Sgt. A. R. ROGERS, R.A.F.V.R., No. 103 Sqn.
Flt. Sgt. J. SMITH, R.A.F.V.R., No. 35 Sqn.
Flt. Sgt. W. G. SMITH, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. C. F. SOLLY, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. I. G. STEPHENS, R.A.F.V.R., No. 97 Sqn.
Flt. Sgt. H. TOON, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. H. A. T. WARNER, R.A.F.V.R., No. 100 Sqn.
Flt. Sgt. D. E. WESTERMAN, R.A.F.V.R., No. 50 Sqn.
Flt. Sgt. H. L. WILSON, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. G. W. WOOD (since deceased), R.A.F.V.R., No. 97 Sqn.
Act. Flt. Sgt. G. E. DUNNING, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Sgt. F. R. WATSON, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Sgt. J. WRIGLEY, R.A.F.V.R., No. 97 Sqn.
Sgt. J. ALDRITT, R.A.F.V.R., No. 166 Sqn.
Sgt. R. H. BATEMAN, R.A.F.V.R., No. 44 Sqn.
Sgt. L. BROOKS, R.A.F.V.R., No. 101 Sqn.
Sgt. R. A. BUNYAN, R.A.F.V.R., No. 61 Sqn.
Sgt. W. CAMPBELL, R.A.F.V.R., No. 166 Sqn.
Sgt. J. A. DODDS, R.A.F.V.R., No. 166 Sqn.
Sgt. J. ELLIS, R.A.F., No. 12 Sqn.
Sgt. C. FAIRBAIRN, R.A.F.V.R., No. 626 Sqn.
Sgt. D. K. FRASER, R.A.F.V.R., No. 101 Sqn.
Sgt. D. FRISKEY, R.A.F.V.R., No. 207 Sqn.
Sgt. F. GARRETT, R.A.F.V.R., No. 44 Sqn.
Sgt. A. C. JOYNER, R.A.F.V.R., No. 166 Sqn.
Sgt. W. G. LAMONT, R.A.F.V.R., No. 207 Sqn.
Sgt. K. E. MACDONELL, R.A.F.V.R., No. 12 Sqn.
Sgt. W. MORTIMER, R.A.F.V.R., No. 625 Sqn.
Sgt. J. E. MULDOWNEY, R.A.F.V.R., No. 101 Sqn.
Sgt. F. D. ROBERTS, R.A.F.V.R., No. 57 Sqn.
Sgt. K. F. SCOTT, R.A.F.V.R., No. 101 Sqn.
Sgt. J. WATERHOUSE, R.A.F.V.R., No. 9 Sqn.
Sgt. R. A. WHITLEY, R.A.F.V.R., No. 166 Sqn.
Flt. Sgt. A. J. CROLL, R.A.A.F., No. 97 Sqn.

CO-BELLIGERENT : A Savoia Marchetti 82 transport which was completely rebuilt from salvaged parts of other aircraft. These aircraft are capable of carrying a fighter inside the fuselage.

SERVICE AVIATION

THE KING has been graciously pleased to approve the following awards.

Air Force Cross

Act. Sqn. Ldr. A. F MARTINDALE, R.A.F.V.R.—This officer has rendered outstanding service as a pilot during the last two years. On a recent flight the airscrew and part of the engine broke off, but Sqn. Ldr. Martindale recovered control of the aircraft in circumstances of extreme difficulty and effected a perfect landing.

Military Medal

L.A/C L. C. SOFTLEY, R.A.F.V.R.—This airman, as a motor driver, took part in the initial landings both in Sicily and in the Salerno sector. On all occasions he was fearless and unflinching in the execution of the tasks allotted to him, however difficult the conditions. His cheerful courage after receiving the serious wounds which cost him the loss of his left leg was the admiration of all in the unit.

Fleet Air Arm

THE KING has been graciously pleased to approve the following award for great courage in rescuing the pilot of a crashed aircraft:—

B.E.M. (Mil.)

Air Mech. 1st Cl. G. W. J. GAMON.

Roll of Honour

Casualty Communiqué No. 396.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents, and natural deaths.

Of the names in this list 92 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. C. H. Bagot; Sgt. E. M. Brepscher; Sgt. R. Cameron; Sgt. F. A. Clayton; F/O. E. E. Evans; Sgt. J. Grady; Flt. Sgt. G. Harvie; Sgt. G. Haugh; F/O. D. J. Holties; F/O. D. Keen; Flt. Sgt. W. C. Pope; Sgt. A. J. Rogers; Sgt. R. Thomas; Flt. Sgt. B. T. Utting; Sgt. B. F. Welch; Sgt. G. Wilson; Sgt. W. A. Youngjohns.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. S. Airey; Sgt. J. A. Baxter; Flt. Sgt. W. C. Coates; P/O. M. L. Glynn; Sgt. A. W. Kind; Flt. Sgt. A. H. Marshall; Flt. Sgt. M. Neill; Sgt. W. J. Preece; W/O. J. Roberts; Sgt. R. A. Sims.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Cpl. K. T. Alexander; Sgt. V. Allen; Flt. Sgt. K. Archer; F/O. N. Avery; Flt. Sgt. R. W. Barlow; Sgt. R. V. Bragg; Flt. Sgt. A. C. Browning; F/O. C. E. T. Bryan; F/O. J. H. Charnock; Sgt. W. B. Clarkson; Sgt. A. Cloud; Sgt. G. N. Cochrane; Sgt. H. M. Cornes; Sgt. B. D. C. Cox; Sgt. P. W. Cramb; Act. Sqn. Ldr. J. A. Crompton; Sgt. D. Daniels; P/O. A. W. Davies; F/O. P. O. Davis; Flt. Lt. J. A. Dewhirst; F/O. D. C. Elder; Sgt. S. W. Evans; Sgt. G. W. Farler; W/O. J. Flynn; Sgt. A. J. Flower; Sgt. R. Foster; Sgt. R. Fowlston; Sgt. L. F. Freeman; Sgt. G. George; Sgt. J. E. Goddard; Sgt. B. Gorman; Sgt. H. G. Griffiths; Sgt. F. Groom; Sgt. D. A. Crowsley; P/O. E. H. M. Harbour; Sgt. J. F. Harper; F/O. R. H. W. Harris; Sgt. L. J. Henley; P/O. R. G. Higgins; F/O. C. G. Hill; Sgt. B. L. Howard; Flt. Sgt. D. P. P. Hurst; P/O. E. James; Flt. Lt. H. A. Kidd-May; F/O. R. G. McInnes; Sgt. E. E. Matty; Sgt. G. E. Milton; Sgt. J. Oxley; W/O. A. W. H. Page; Flt. Sgt. T. R. Parker; Sgt. R. S. Pickard; F/O. H. J. Randall; Sgt. R. O. S. Selwyn; P/O. K. G. Sheward; Sgt. R. W. Slaughter; Sgt. J. R. G. Smith; Sgt. J. Smith; Sgt. R. S. Smith; Sgt. W. H. J. Smith; Flt. Sgt. D. S. Somers; Sgt. T. Stanley; Sgt. H. H. Stockley; Sgt. G. W. Stokes; Sgt. B. Stokes-Roberts; Act. W/O. J. S. Stoneman; Sgt. W. J. Stiles; Sgt. K. C. Tate; Sgt. G. Thomson; Sgt. A. E. G. White; Sgt. D. O. Wilcox; P/O. D. Williams; Sgt. D. A. Wood.

WOUNDED OR INJURED IN ACTION.—Sgt. A. Davenport; Sgt. H. R. W. Holman; P/O. T. Jones; Sgt. G. B. Mabey; Sgt. E. G. Moorhouse; Sgt. W. E. Parry, Sgt. D. V. G. Smith.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. S. G. Bentley; F/O. G. J. G. de Marigny; Sgt. J. A. Morris; Flt. Lt. F. Musgrove; Flt. Lt. N. Stewart; Act. W/O. J. White, D.F.M.

MISSING.—Flt. Lt. R. H. Ackland; Sgt. N. S. Alkemade, W/O. R. H. Adams; Sgt. D. A. Anderson; Flt. Sgt. K. S. Anderson; Sgt. E. A. Anthony; Flt. Sgt. V. E. Aspin; P/O. J. L. Atkinson; W/O. R. F. Badman; Sgt. D. A. Bean; F/O. H. J. Billington; F/O. N. E. Blight; Sgt. R. J. A. Boon; Sgt. J. N. Boston; F/O. H. Bowling; Sgt. E. W. Brown; Flt. Sgt. E. M. Buckingham; Sgt. R. F. Budgen; Sgt. J. C. Burdett; Sgt. C. V. Byatt; Sgt. L. A. Chappell; Sgt. W. G. Clapp; Sgt. J. H. Clayton; P/O. E. P. Cliburn; Flt. Sgt. G. F. Clulow; Sgt. N. L. Cooper; Sgt. T. H. Cox; Sgt. C. Craigie; Sgt. W. J. E. Cumberland; F/O. A. P. Cummins; Flt. Sgt. K. Dadds; Sgt. L. G. Darben; Sgt. W. B. Dixon; Sgt. W. F. Edwards; Sgt. M. Ellick; W/O. E. C. Ells; F/O. E. C. Espley; Sgt. T. J. Evans; Sgt. F. E. Eyres; Sgt. C. E. R. Fox; Flt. Sgt. J. E. Frith; Flt. Sgt. R. Golding; Sgt. L. H. Green; Sgt. J. H. Greenslade; Flt. Sgt. R. Greig; Flt. Sgt. J. V. Groves; Sgt. J. C. Guthrie; Flt. Sgt. T. W. J. Hall; Flt. Sgt. A. Hamilton; Flt. Sgt. C. C. Hardy; Sgt. J. F. Harris; Flt. Sgt. F. C. Harvey; Sgt. W. N. Hedges; Sgt. G. W. Henson; Sgt. C. A. Hilder; Flt. Sgt. J. A. Hildreth; Act. Sqn. Ldr. F. P. Hill; Flt. Sgt. F. Hobbs; F/O. F. R. Hocken; Sgt. R. A. Horton; W/O. R. Howells; Flt. Sgt. H. G. Howes; Sgt. T. Hughes; Sgt. W. N. James; Sgt. J. Jamieson; Flt. Sgt. A. H. Jefferies; Sgt. E. G. Johnson; Sgt. A. O. Johnston; Sgt. S. Jones; Sgt. W. Jones; Sgt. W. D. Jones; Sgt. J. W. Kearley; Sgt. F. Keightley; P/O. R. W. Kennedy; F/O. G. D. Kewley; F/O. J. L. Larsen; Flt. Sgt. R. Lawley; Sgt. H. R. Lawrence; Sgt. W. Lindsay; Sgt. W. Longden; Sgt. J. W. Love; Act. Flt. Lt. C. A. Lyon; Sgt. J. J. McDonough; Sgt. J. MacDougall; Sgt. P. J. MacInnes; P/O. W. C. McLeod; Sgt. N. Max; Sgt. C. B. Mills; Sgt. R. C. Mills; Sgt. E. R. R. Moulding; Sgt. D. V. Menell; Flt. Sgt. J. A. Newman; P/O. F. L. Newstead; Sgt. L. V. Norton; Sgt. B. Nutley; Sgt. G. J. Oliver; Sgt. E. H. Orchard; Sgt. J. Ord; Sgt. P. R. Oxley; Sgt. R. H. Paxton; Flt. Sgt. C. Peacock; F/O. C. E. Peake; Sgt. R. Pennykidd; Flt. Sgt. L. J. Phillips; F/O. J. B. Poad; Sgt. G. A. Poole; F/O. T. H. Prickett; F/O. J. Puver; Sgt. J. R. Quicke; Flt. Sgt. V. G. Raymond; F/O. G. L. Reynolds; Sgt. C. Roberts; Sgt. G. S. Robertson; Sgt. S. Robson; Sgt. W. C. Robson; Sgt. C. Saunders; Sgt. D. Savage; Sgt. R. J. Service; Sgt. D. V. Simmonds; Sgt. H. Simpson; Sgt. F. W. Skelcher; Sgt. D. W. J. Smith; Sgt. R. Smith; P/O. T. Southworth; Sgt. H. A. Spencer; Flt. Sgt. D. J. Tucker; Sgt. R. A. G. Turner; Sgt. G. W. Walker; Flt. Sgt. M. A. Ward; Sgt. E. W. J. Warren; Sgt. L. G. Washer; Sgt. T. C. Watson; Sgt. A. P. Webb; Flt. Lt. H. J. L. Webb; Sgt. S. W. Wheeler; F/O. R. A. Whitaker; Flt. Sgt. H. Whiteley; Sgt. J. W. Whitley; Flt. Sgt. I. G. Williams; Sgt. N. Worboys.

KILLED ON ACTIVE SERVICE.—Sgt. L. W. H. Brown; F/O. J. Jacklin; Sgt. E. P. Moore; Cpl. A. H. Palmer; Sgt. D. G. Stephens; Sgt. R. Thorpe; Sgt. B. Woodhead.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. G. Duncan; F/O. J. R. Keevil.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. A. E. Jenks.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—P/O. A. J. Cogbill.

DIED ON ACTIVE SERVICE.—A/C.1 S. Biss; L.A/C. W. J. Cox; Flt. Sgt. C. W. Etheridge; A/C.1 R. G. Hitchcock; Cpl. K. W. Littleboy; A/C.2 K. W. Pilbrow; A/C.1 N. W. Rhodes; A/C.2 W. Roe.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Act. Flt. Lt. P. Barber; Act. Sqn. Ldr. T. W. A. Hutton; Sgt. C. Lindsay; F/O. D. Nichol; F/O. D. R. Perrin; Flt. Lt. O. J. Wells.

"PRANGED": A badly damaged Lancaster which came home with the tail turret hanging, all the instruments smashed and three men holding the stick and rudder bars The pilot, P/O. R. R. Reed, was awarded the D.S.O. and the citation **appears on page 675.**

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. E. Dodds, A/CW.2 H. I. Harrison.

Royal Australian Air Force

KILLED IN ACTION.—P/O. P. G. Melville.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. G. A. Rourke.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. J. A. B. Cooper.

MISSING, BELIEVED KILLED IN ACTION.—W/O. P. V. Waddell.

MISSING.—Flt. Sgt. G. Brougham; Flt. Sgt. J. W. J. Buckland; P/O. R. L. Clark; Flt. Sgt. J. T. Gill; Flt. Sgt. K. C. Green; P/O. J. A. Haste; Flt Sgt. R. H. G. Parker; Flt. Sgt. L. F. Peel; Flt. Sgt. H. W. Pronger; Flt. Sgt. K. McD. Radley; P/O. R. Rogers; F/O. M. S. Thorpe; Flt. Sgt. A. H. Williams.

KILLED ON ACTIVE SERVICE.—F/O. J. S. Briggs; Flt. Sgt. B. J. Jones; Sgt. D. L. Watson.

Royal Canadian Air Force

MISSING.—F/O. P. Dowd; F/O. J. Duncan; F/O. P. C. Edwards; F/O. A. E. Guthrie; P/O. A. Jones; W/O. L. G. Scott.

KILLED ON ACTIVE SERVICE.—P/O. P. T. Bath.

WOUNDED OR INJURED ON ACTIVE SERVICE.—F/O. J. W. Braithwaite.

Royal New Zealand Air Force

KILLED IN ACTION.—F/O. H. G. Gray; W/O. E. D. McFarlane.

MISSING.—F/O. W. R. Baillie; Flt. Sgt. R. L. Cato; F/O. M. G. Hutchinson; P/O. A. E. Lander; Flt. Sgt. C. R. Parkinson; P/O. B. C. Riddle.

KILLED ON ACTIVE SERVICE.—F/O. E. N. J. Thomson.

South African Air Force

KILLED IN ACTION.—Lt. S. V. Richardson.

MISSING.—2/Lt. C. C. Geldard; Lt. M. McCardle.

KILLED ON ACTIVE SERVICE.—F/O. Dick; 2/Lt. K. Ross.

DIED ON ACTIVE SERVICE.—Lt. A. J. Primsloo.

Official Corrections

Casualty Communiqué No. 395.

Under "MISSING," delete F/O. J. P. Headlam and Sgt. G. E. Watts.

Air Transport Auxiliary

First Officer CLAUDIUS ECHALLIER, A.T.A., and Senior Flight Engineer ROYSTON EDWIN STANIFORD, A.T.A., killed whilst flying His Majesty's aircraft in Scotland.